THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades

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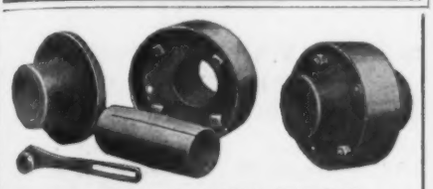

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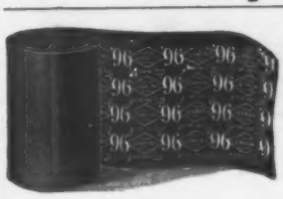

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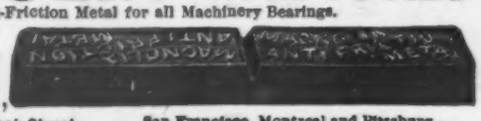

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THE IRON AGE

New York, Thursday, December 7, 1905.

The La Belle 84-Inch Plate Mill.

Illustrations are herewith given of the 84-inch plate mill recently built for the La Belle Iron Works, Steubenville, Ohio, by the United Engineering & Foundry Company, Pittsburgh, Pa. The mill itself is shown in Figs. 1 and 2, Fig. 1 being the entering side and Fig. 2 the off side. Fig. 3 is a ground plan, showing the arrangement of the rolls, conveyor tables and auxiliaries.

This mill has a number of interesting features. The conveyor tables between the furnace and mill are arranged with extra heavy solid rollers immediately in front of the opening of the furnaces, on which the piece falls when pushed out by the slab pushers. This is a particularly heavy design of table, with rollers very close together, having extra large brass bushed bearings, and are carried by heavy steel beams, strongly reinforced at the point where they cross over the flues for the furnaces. It will be noted that this table is broadened out at a point near the tilting tables to receive the ends of any long plates which may overlap the actual tilting portion of the main tables. The wide section is of similar design to the narrow portion, the rollers being made heavier to make up for the extra long length.

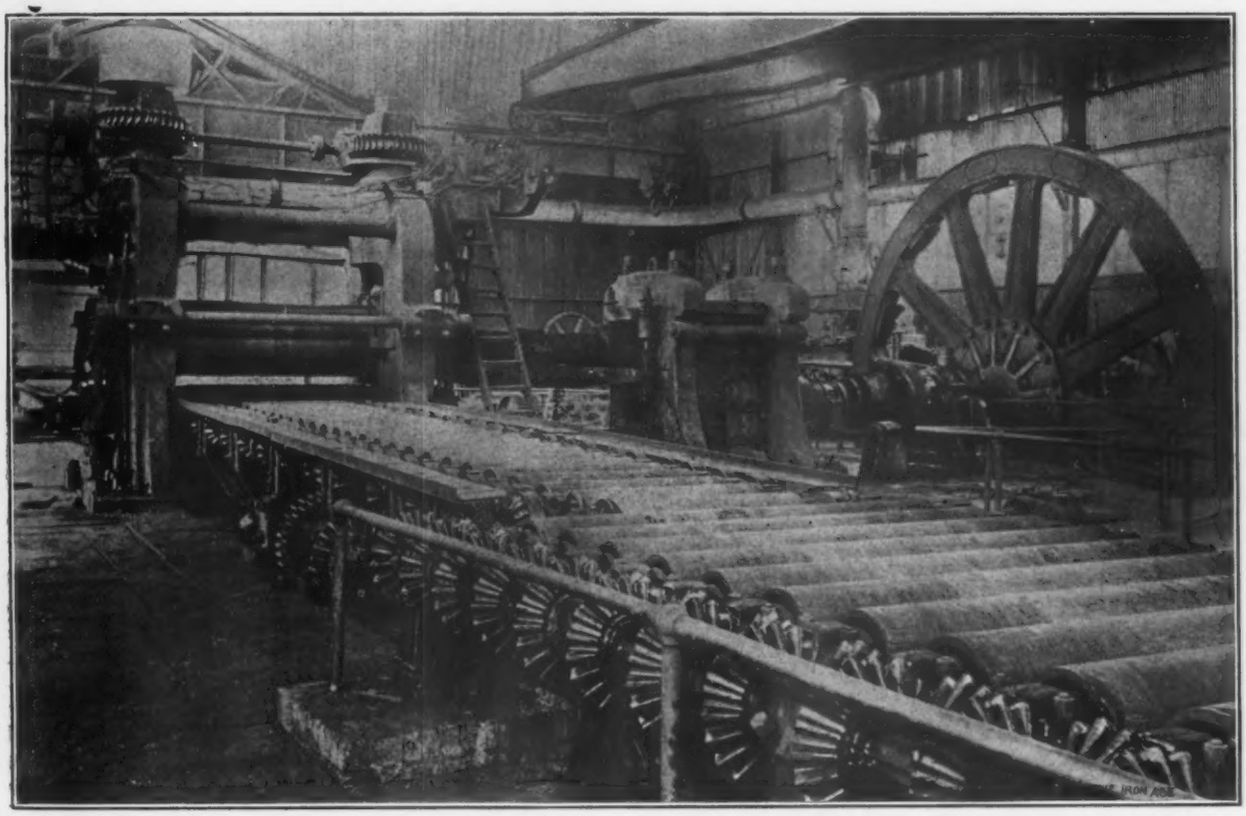


Fig. 1.—The La Belle 84-Inch Plate Mill.—Entering Side.

The tilting tables are in some respects of novel design. A cradle is used instead of the regular plain bearings; this cradle is a babbitted and brass bushed bearing, which allows of the fulcrum point being located at a convenient hight to suit a direct drive, using the simplest arrangement of gears possible, thus doing away with the ordinary large number of gears at this point and making it very easy of access for repairs. This will be understand more easily by referring to Fig. 1, which covers this portion of the work. These tables are very close centers, which necessitates driving them from a main line shaft on both sides of the table. All the gears and side brackets are cast steel, bolted with body bound bolts, with reamed fit, to the cheek plates, which are 24 inches long and 2½ inches thick, giving a very broad and ample bearing to all the bolts, the lack of which has been a common fault in most plate mill tables. The tables from the center of the mill are 30 feet 6 inches long and have a stroke of about 22 inches, operated by one set of connecting links to both sides of the table from a cylinder located under the wide portion of the conveyor table, this cylinder being arranged to choke the water and cushion the table both on its upward and downward direction. All the roller bearings are machined endwise, thus making one continuous connection between all the bearings on the table, and they are all interchangeable.

Heavy type 10 x 12 inch engines are used to drive these tables, which are operated by the Ahlen hydraulic operating rig, from one lever on the pulpit. This pulpit, not shown on the plan, is fitted with Wood's valves, which are of late design and are giving excellent satisfaction.

The mill itself is a standard 30 x 84 inch United Engineering & Foundry Company plate mill, but in many particulars is much heavier than the company's regular mill heretofore built. This was necessary for the reason that an exceptionally large engine, 44 x 60 inches, is used to drive it. This of course will allow of the mill being pushed to its utmost capacity and should result in a very large output of the class of product for which it is intended. The screw down is operated by an electric motor, with worm connection to the screws, and in this case a slip gear has been specially designed as a safety guard feature in case any undue strain is brought on the screws through a piece sticking between the rollers or some other accident of similar nature. The middle

roll is arranged to lift by hydraulic cylinders, while the upper roll has a special design of steelyard balance, which is arranged to take the weights out of the pit, thus avoiding the ordinary trouble of scale filling up all around the weights and levers.

The tables leading up to the straightening machine and to the shears are all of similar design—namely, having brass bushings in the bearings, steel miters, and in general construction being stiff and strongly made tables, similar to but wider than the conveyor table at the furnaces. They are driven by 50 horse power motors of the regular street car type, and of course have interchangeable base plates with the other similar motors used on the mill.

The straightening machine shown in Fig. 4 is of the nine-roll type, very heavy and compact in design, all the rollers being forged steel and the upper ones balanced. It has a capacity to straighten 1-inch plates the full width of the machine and is arranged for motor drive.

The shears, Fig. 5, are of very heavy construction, 110 inches wide, with steel gearing, steel crabs and forged steel main shaft, driven by 75 horse-power A. C. motors. The slitting shear is of the same design, but arranged with a different opening in the knife to suit its particular class of work. A somewhat different arrangement is used at the first, or cross-cut, shear than usual, inasmuch as the plates are carried through the back of the shear before cutting, the tilting table being used to allow the scrap to go down when being sheared.

A roll turning device has been built for this mill which is arranged somewhat differently from the regular method found in most mills. The bed plates are extended on the outer end of the mill and the roll turning rig is applied on this end—that is, the power is taken through the bottom roll first, then to the pinions and thus to the top roll, not using the main engines at all, the turning rig being operated by a direct geared 20 horse-power A. C. motor. This makes a neat self contained arrangement, which is designed to be lifted away when not in use by the regular traveling crane which spans the mill. As will be observed in the illustration Fig. 6, it is in a very compact design, all the shafts being very accessible in case of any trouble, and as a whole makes a very stiff and rigid construction. All the main gears are machine molded and the two pair of high speed gears are cut, with forged steel pinions. All shafts are forged steel and the frame is cast iron. It will be noted that the connection to the mill for operation is with one of the regular half coupling boxes.

All of the above machinery, including the conveyor table, mill and mill tables, runout tables, straightening machine and shears, was designed and built by the United Engineering & Foundry Company, with the cooperation of W. D. Crawford, the manager of the plant.

The heating plant was built by Alex Laughlin & Co., Pittsburgh, Pa., and consists of two of their patented automatic discharge continuous heating furnaces and five grateless water seal gas producers. Fig. 7 shows the plan and Fig. 8 the elevation of these furnaces, the feature of which is that the slabs are charged at one end of the furnace and are pushed through the furnace to the other end, where they are discharged by gravity on the conveyor which carries them to the mill. The capacity of these two furnaces varies greatly according to the size and thickness of the slabs, but the builders state that the average capacity would probably be about 200 tons per single turn.

The engine which drives this mill, Fig. 9, is a horizontal Corliss, with a cylinder 44 inches in diameter by 60-inch stroke. It is of massive construction, with large wearing surfaces throughout, being designed and built by Mackintosh, Hemphill & Co., Pittsburgh, Pa., who make a specialty of this class of work. The crank shaft journal bearings are 21 inches in diameter and 36 inches long, the body of the shaft being 25 inches in diameter. The fly wheel is 24 feet in diameter, weighing 50 tons. The total weight of the engine is 380,000 pounds.

When started in August the mill made a very creditable output from the commencement and on several turns recently has made record breaking runs.

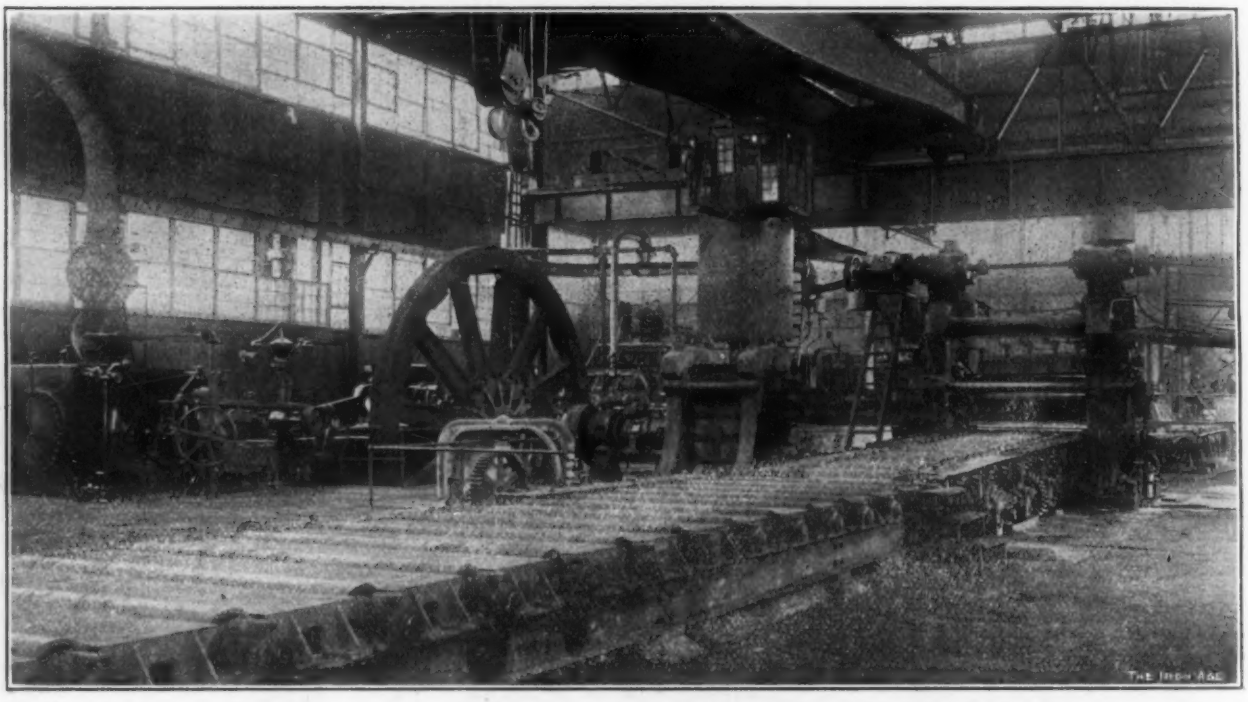


Fig. 2.—The La Belle 84-Inch Plate Mill.—Off Side.

The Passaic Steel Company.

Arrangements consummated recently have brought an adjustment of the financial difficulties of the Passaic Steel Company, Paterson, N. J. The structural mills and bridge works of the company are now making a record in production, and with a continuance of present conditions in the iron trade the outlook is for the gradual extrication of the company from the entanglements that have hampered its operations for some months.

The negotiations with bondholders and creditors, which recently have been brought to a successful conclusion,

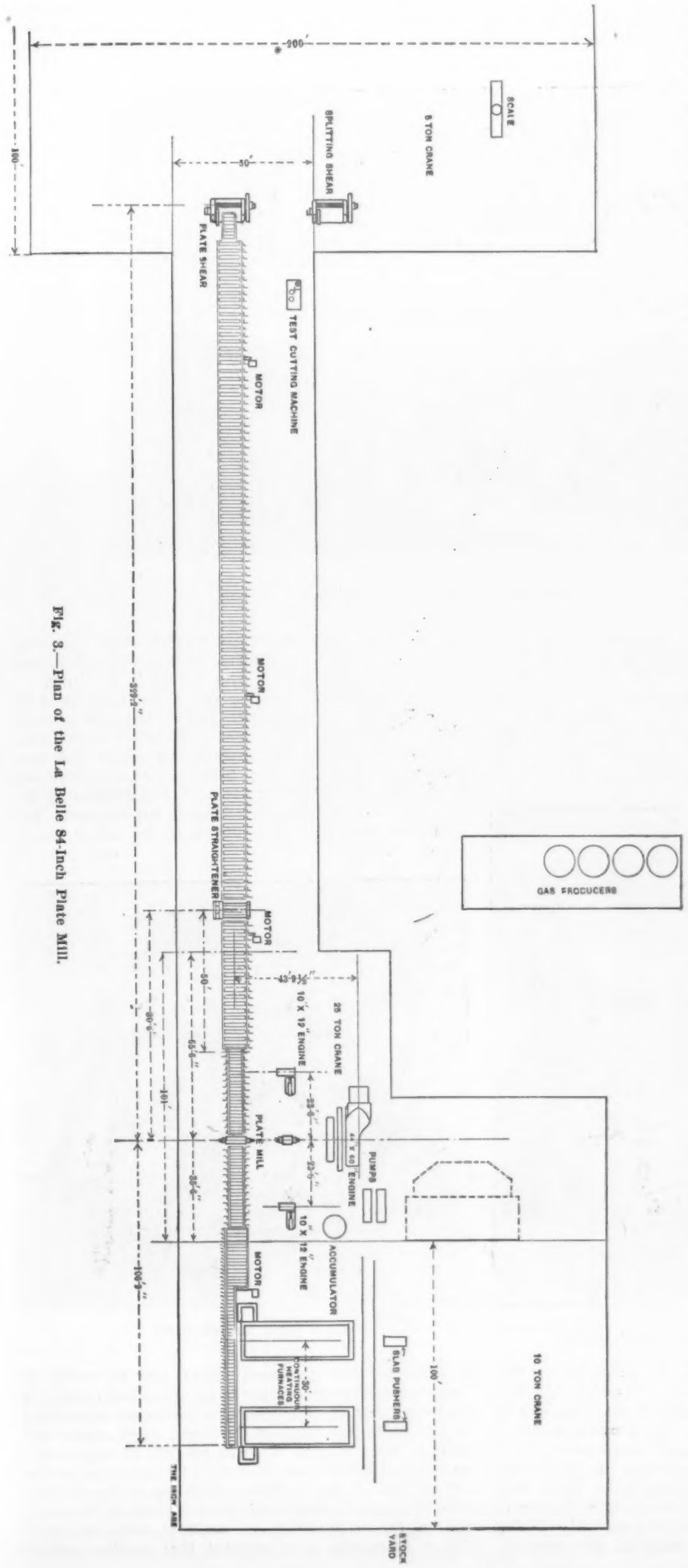


Fig. 3.—Plan of the La Belle 84-inch Plate Mill.

were prolonged by complications in the company's finances, the result in part of the slackness in the iron trade last year; in part of the heavy outlay necessary for rehabilitating the plant after years of small outlay for maintenance and improvement. The changes made on the coming in of a new management were also a factor. Briefly, the steps recently taken involved the issue of $1,000,000 of preferred stock, of which nearly four-fifths has been subscribed and nearly one-half has been paid in. The Passaic Steel company was organized in November, 1902, to take over the properties and business of the Passaic Rolling Mill Company, but the actual transfer did not take place until February 16, 1903. A. C. Fairchild was elected president of the new company, F. F. Searing vice-president and J. Barclay Cooke secretary and treasurer. Mr. Fairchild had been vice-president of the Passaic Rolling Mill Company and was president of that company for a few months preceding February, 1903, following the retirement of W. O. Fayerweather, who had been president and the principal stockholder for a number of years. The Passaic Steel Company took over the entire capital stock of the Passaic Rolling Mill Company in exchange for shares in the new company, which was capitalized at $5,000,000. There was a bond issue of $2,500,000, of which the proceeds of $2,000,000 went to the purchase of the leading holdings in the old company, while the proceeds of the remaining $500,000 were to be devoted to improvements on the property. The programme of improvements begun under the new management in 1903 consisted of the building of two new 50-ton open hearth furnaces equipped with a charging machine, the building of a new soaking pit furnace, the installation of a new engine for the 21-inch mill and of a new generator of 200 kw. capacity. As a matter of fact the expenditures amounted to $824,000, so that the excess over the $500,000 provided for became a charge against the working capital of the company.

On April 1, 1905, Niven McConnell, who had built the Donora, Pa., plant for the Union Steel Company, became connected with the Passaic Steel Company as vice-president and general manager. It was the expectation, in connection with Mr. McConnell's coming, that $750,000 would

be raised by the issue of preferred stock to provide additional open hearth furnaces, the finishing capacity of the plant having always been much in excess of its output of ingots. Other improvements were contemplated also, but none of the plans were carried out, as the preferred stock was not subscribed for in the way anticipated, only $55,000 of it being taken. Some other money was raised on notes to make changes decided on by the new management, but the amount soon appeared to be inadequate. The blooming mill required to be overhauled and $15,000 was spent on this account, an additional handicap resulting from the shut-down of six weeks required for the work. At the same time the 9-inch mill and the 18-inch mill, which had formerly been devoted to the manufacture of merchant bars, were taken out. The occasion was furnished by what the management considered unreasonable demands by the men employed on these mills, but it had been decided that the removal of these mills, which furnished a relatively small part of the output of the plant, would make possible the provision of much better shipping facilities for the structural material that went to the general trade. Previously such material had been handled from the same shipping yard to which material went that was destined for the bridge works. Other changes were made calculated to give greater economy by reason of the direct progress of finished steel through the various departments with saving in handling.

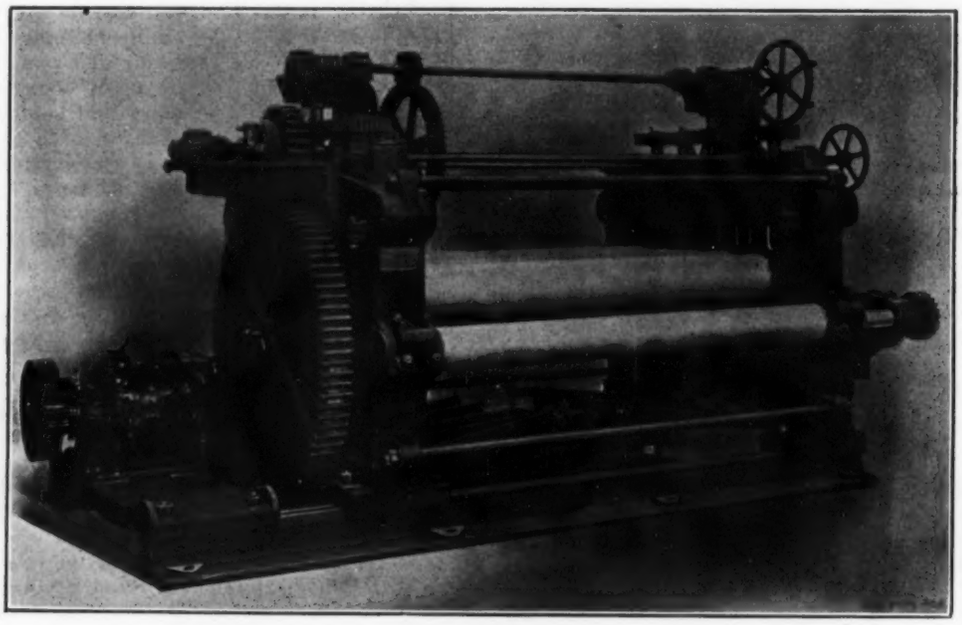


Fig. 4.—Motor Driven Plate Straightening Rolls.

The problem of financing the expenditures thus incurred became more difficult, and in the past summer reached the acute stage. The bondholders were called together in August, and after the situation had been thoroughly gone over they made a proposition to the directors. It provided for the taking of $360,000 of the preferred stock by the bondholders at par for cash. The conditions were that all indebtedness for money loaned be converted into preferred stock; that $2,500,000 of common stock be turned over to three trustees to be held for the account of the preferred stockholders subscribing to the $1,000,000 issue of preferred stock authorized April 4, 1905; that as much as possible of outstanding merchandise liabilities be converted into preferred stocks A committee of the creditors, consisting of James Eastwood, Thomas J. Arnold and Niven McConnell thereupon took up the matter with the creditors, with the result that a proposition was accepted that creditors whose

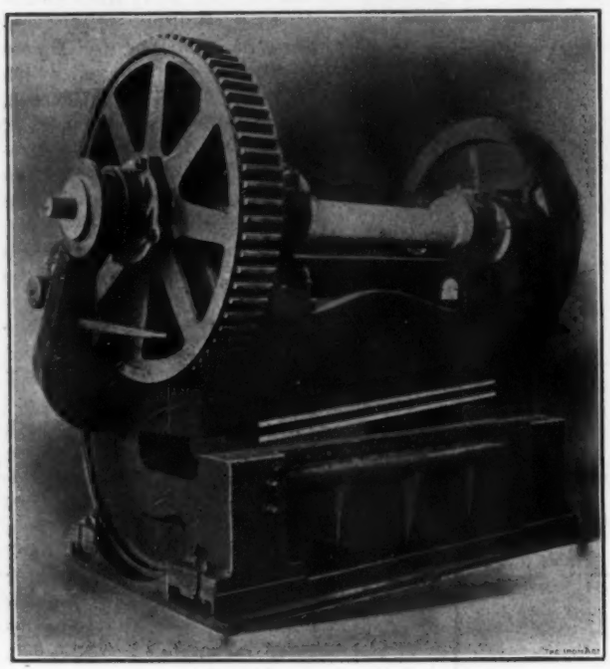


Fig. 5.—Motor Driven 110-Inch Plate Shears.

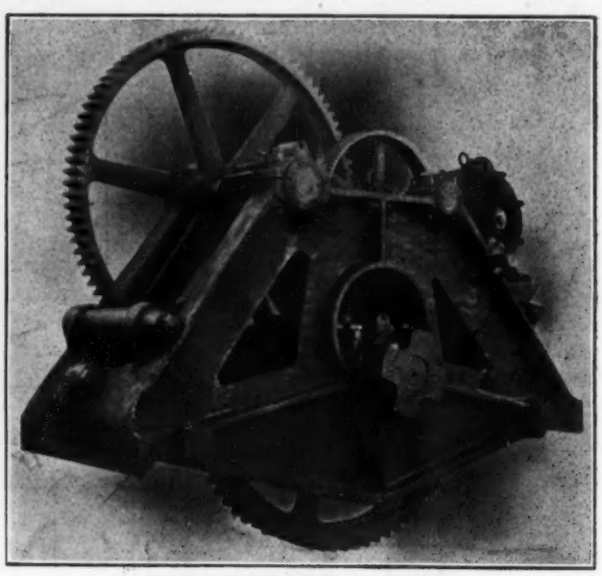


Fig. 6.—Roll Turning Device.

claims aggregated at least 75 per cent. of the total should subscribe for preferred stock to the extent of at least 37½ per cent. of their claims. It was provided that each creditor so subscribing should receive in addition to the preferred stock trust certificates for common stock at the rate of two and one-half shares of common stock for each share of preferred stock. Representing the Creditors' Committee, J. A. McGregor, assistant secretary and treasurer of the Bethlehem Steel Corporation, made a minute examination of the Passaic Steel Company's books and prepared a complete statement of its affairs.

The plan for financing as above outlined was successfully carried out in October, with the result that the company is now doing business on a cash basis. Of the $1,000,000 of the preferred stock authorized $495,145.50 had been subscribed and paid for by November 1, 1905, and in addition $294,000 had been subscribed to be paid for in full by March 10, 1906, installments being payable November 10, December 10, January 10, February 10 and March 10. A statement of the company's quick assets on November 1, 1905, showed a total about $500,000 in excess of current liabilities. The outstanding common stock is $5,000,000; first mortgage bonds, $2,500,000; preferred stock subscribed for, $784,145.50.

The present officers of the company are the following: President and general manager, Niven McConnell; secretary, F. A. Shick; treasurer, J. B. Cooke. The Executive Committee is composed, in addition to the above, of the following, who represent the bondholders: W. D. Zehnder, president Scranton Bolt & Nut Company, Scranton, Pa.; Hon. Benj. K. Focht, Lewisburg, Pa., of Davis & Focht, Sunbury, Pa., and director of the National Deposit Bank, Philadelphia; Wm. A. Arnold, president American Silk Dyeing & Finishing Company, Hawthorne, N. J. The Executive Committee meets each alternate Tuesday at the office of the company in Paterson to go over the business done the preceding two weeks and pass upon the policy and plans for improvements submitted by the management.

As outlays can be made for them, the efficiency of the plant is thus being gradually increased. The output of ingots in November was the largest the plant has made. The October total was also a record. The November output of blooms was also a record, as was the production of finished material in October. The best tonnage record for 24 hours in the finishing department was made on November 30, 1905, when the 28-inch mill rolled 240 tons and the 21-inch mill 128 tons, a total of 368 tons. On a recent trip to the works a representative of *The Iron Age* found evidences that the changes already made and those in progress are such as to give a good account of themselves in future operations. With the improved

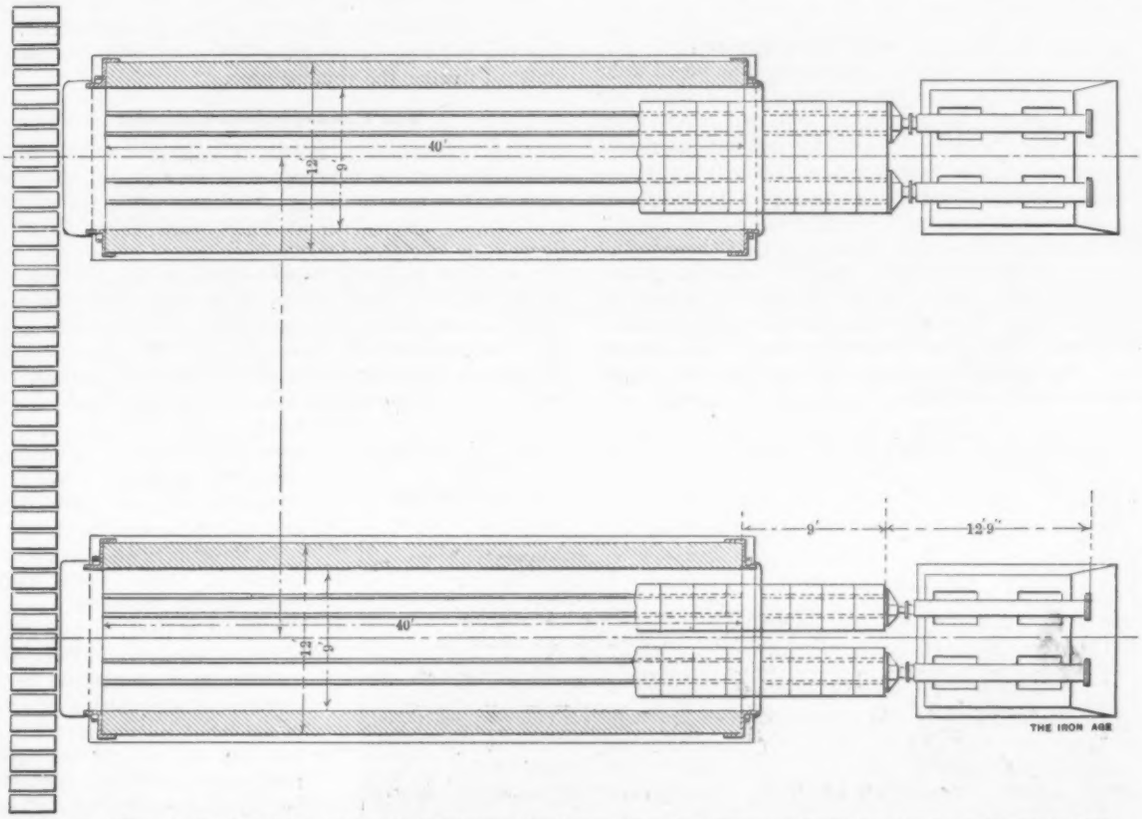


Fig. 7.—Plan of the Laughlin Automatic Discharge Continuous Heating Furnaces Built for the La Belle Plate Mill.

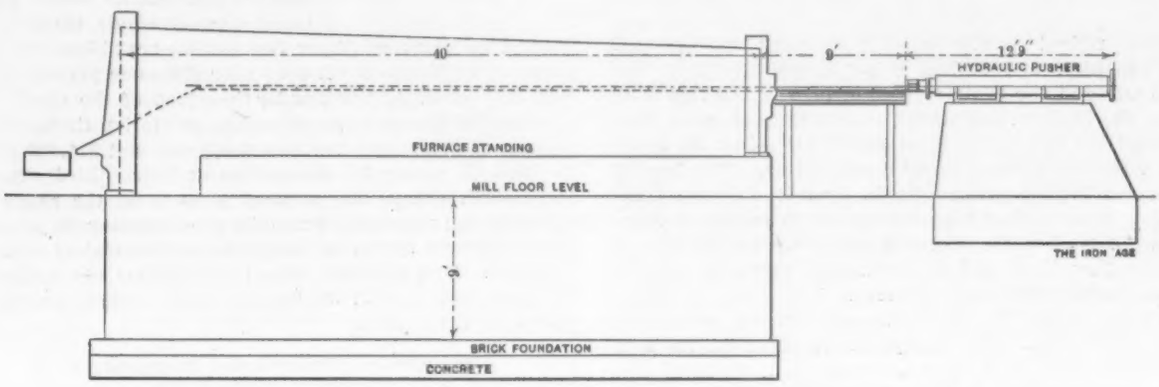


Fig. 8.—Elevation of the Laughlin Continuous Heating Furnaces.

physical condition of the plant and the experience and harmonious co-operation of those in authority the enterprise has seemingly good prospects of success.

The Hudson River Tunnels.

Three pairs of tunnels are now being extended under the Hudson River between New York and Jersey City. Of the first scheme,

The Original Hudson River Tunnel,

which was started some 25 years ago, the north tube has been finished between the shores and the south one is rapidly nearing the New York side, the work upon the latter being prosecuted from the western approach. The projectors of this tunnel never reached that stage in the undertaking where it was necessary to determine with any degree of exactness the location of the termini in the two cities. They took the ground that there would be time enough to decide these questions after they had completed the tubes under the river. This was perhaps a wise conclusion, since the completion of the tubes had always been a doubtful proposition until the present company, the New York & New Jersey Railroad Company, obtained the franchise and assumed control.

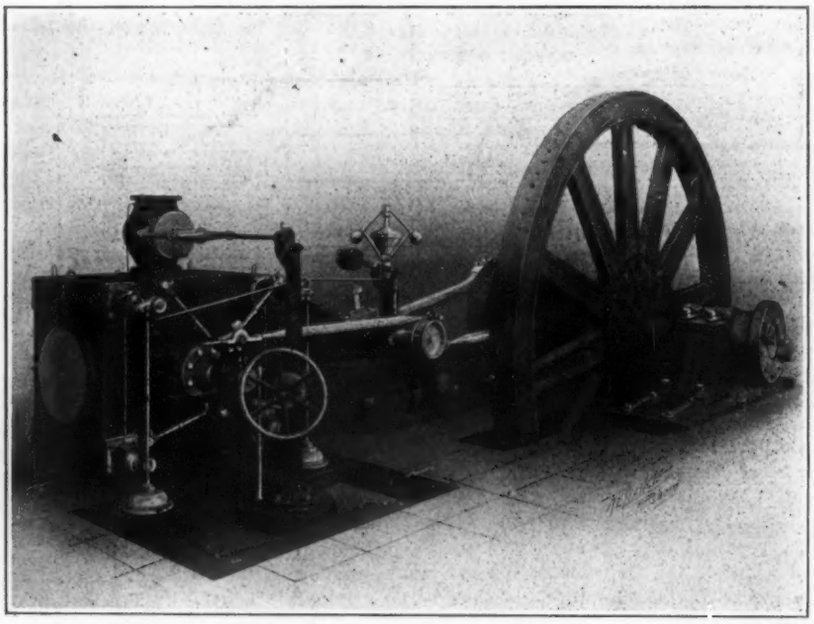


Fig. 9.—The La Belle Plate Mill Engine, Built by Mackintosh, Hemphill & Co., Pittsburgh.

The original charter of this company was granted in perpetuity, and it had a permanent grant by the Land Office of the State of a right of way 160 feet wide under the Hudson, but it had no privilege of more than entering the city—that is, it could not select its route to a terminus without further permission. The law of 1894 creating the present Rapid Transit Railroad Commission gave to that body full power in regard to franchises for roads to be operated wholly within the city of Greater New York and also railroads operated without the city and desirous of entering. The company therefore made application to the commission for permission to extend its line. The extended route led from the foot of Morton street to Greenwich street, to a terminal station at Christopher and West Tenth streets; thence west along Christopher and West Ninth streets to Fourth avenue, and also north under Sixth avenue to Thirty-third street. All this work was to be done at such a depth as would not interfere with any underground roads that might in the future be laid down by the commission.

When these extensions shall have been completed the company is to pay the city 50 cents per linear foot of single track and of station platform for the first ten years and $1 per annum per linear foot during the next 15 years. An additional annual payment is to be made of 3 per cent. of the gross receipts for the first ten years and 5 per cent. afterward. The gross receipts for the first ten years are agreed to be $300,000. Although the charter is a perpetual one the rental paid to the city is to be readjusted at the end of every period of 25 years.

Although at first intended as a steam road solely the plans have been changed so that only a trolley service will use the tubes. The route forms connections with both the east and west side New York Elevated Railroad systems and with the present subway, and acts as a feeder for the entire New York dry goods district. At the present rate of progress the work will probably be finished during the coming year.

The Pennsylvania Tunnels.

This undertaking, noted as calling for the largest single contract for iron and steel ever placed, something over 500,000 tons, is being prosecuted all along the line. The station excavation at Thirty-third street has been practically completed. The two tubes under the Hudson are being driven from both ends, as are the four tubes under the East River. The large power house located at Long Island City, which was described in our issue of November 2, in connection with the electrification of the Long Island Railroad, has been finished. Extensive plants for tunnel construction have been erected at Long Island City, at First avenue and Thirty-second street and Thirty-third street and Eleventh avenue, New York, and at Wehawken, N. J.

In these days of discussion of municipal ownership of public utilities it is interesting to note the terms of the franchise granted to the Pennsylvania Company. The benefit to be derived by the city from the provision of a terminal station in the heart of the city by one of the great trunk railroads is beyond calculation. And yet the Rapid Transit Commission considered that the benefit was mutual and that, while granting a franchise in perpetuity, it would be no more than just for the company to pay a nominal sum for the privileges it receives.

It therefore pays $100 per year for the use of the river beds outside of the pier head lines; for passing under the piers and docks it must pay the annual sum of 50 cents per lineal foot of single track for the first ten years and $1 per foot for the next 15 years; it must pay at the same rates and for the same periods for each foot of single track under the streets of the city; it must pay for the use of the streets at the station the annual amount of $14,000 for the first ten years and $28,000 for the next 15 years; for the station at Thirty-third street and Fourth avenue the payment is to be at the rate of $1140 for ten years and $2280 for the following 15 years. These amounts are to be readjusted at the end of every 25 years. The company also pays $36,000 per annum for that portion of Thirty-second street which was required by the station.

Hudson and Manhattan Railroad.

This is the third tunnel project between Jersey City and New York. Borings are now being made along the route in New York and preliminary work is going on on the other side of the river. The two tunnels forming the river portion of this scheme will extend from the Pennsylvania Railroad depot in Jersey City across the river almost at a right angle. The south tube passes under Cortlandt street to Church, to Fulton, to the river. The station will be on Church street from Cortlandt to Fulton. There will be a spur from the station to the Fulton-John street station of the subway. This tunnel, like both the others, must be carried at such a depth as not to

interfere with any future plans of the Rapid Transit Commission.

When discussing the franchise to be granted to this company the commission said: "The tunnel authorized by this franchise terminates at the west end at the boundary line between the States of New York and New Jersey, and from that line west the tunnel must be continued under the authority of New Jersey. It is obvious that the New York grant is susceptible of use only in connection with the New Jersey part of the tunnel under the Hudson River. If the New York grant were limited, then at the end of the limited term the grant would be of no use or advantage to the city. A readjustment of rental charges at 25-year intervals will, in cases like this, give the city all the practical advantage of a limitation of the life of the grant." The franchise was therefore given in perpetuity.

The company is to pay $100 for the use of the river bed outside of the pier line; 50 cents per foot of single tracks under the docks for the first ten years and $1 for the next 15 years; the same rate is to be paid for the foot passenger way under Dey street and Broadway; for the underground portions of Cortlandt, Dey and Fulton streets next the station, 40 cents per square foot for ten years and 80 cents for the remaining 15 years. For the right to pass under the streets the company pays $9000 per annum for ten years and $15,000 per annum for 15 years following, these amounts being, respectively, 3 and 5 per cent. of gross earnings of $300,000 per year. At the end of 25 years the rentals are to be readjusted.

This tunnel will serve as a New York station of the Pennsylvania Railroad for passengers and baggage, but its franchise does not permit the company to do a local passenger traffic. The same restriction applies to the other two roads.

At the Jersey City terminus the tunnel will provide connection with the extensive trolley lines of the Public Service Corporation and by that means provide easy access to the business district of New York. It is the intention to connect this terminus with the Central Railroad of New Jersey, the Erie and the Delaware, Lackawanna & Western. Two tunnels will make these connections, running north and south along the shore. This will be longer than the river portion and will require a correspondingly greater amount of material for its construction.

The old Hudson Tunnel and the last mentioned scheme are controlled by the Hudson companies and the plans are being prepared and executed by the same staff. It is expected that the preliminary work will shortly be so far advanced as to warrant advertising for bids for construction.

The work will be done in the same way as in the other two tunnels. The headings will be driven by the shield method and flanged cast iron plates will form the tube proper. The entire route will be under compressed air except the section in New York east of West street. The tunnels under the river will diverge from each other as they near the New York shore and will be independent of each other for the entire distance. In reality the New York portion constitutes a large loop, entering the city at Cortlandt street and leaving at Fulton.

Calculated upon the basis of the Pennsylvania tunnels it is probable that this work will require more than 100,000 tons of metal for the completion of the entire line.

A New Sewer Pipe Company.—After several months of preliminary work locating deposits of clay and experimenting to ascertain its properties it has been decided by the principal stockholders of the Blackmer & Post Pipe Company, St. Louis, to organize the Post Pipe Company under the laws of the State of Texas, with a capital of $125,000, to build and operate a sewer pipe manufacturing plant at Texarkana. The factory will be located on seven and a half acres of ground in the western part of the city and will be directly connected by switches with the Texas & Pacific, Iron Mountain, Kansas City Southern and the Cotton Belt railroads, thus giving unusual facilities for distribution of the product of the plant. The improvements to be erected will be a main factory building of brick, 80 x 252 feet, three stories, with brick annex, 40 x 100 feet, for engine, boilers and heavy clay grinding machinery, and eight 32-foot down draft kilns of the most approved construction. The officers of the Post Pipe Company will be L. W. Post, president; L. R. Blackmer, vice-president; J. T. Wallace, second vice-president; G. R. Payne, secretary and treasurer, and M. P. Post, superintendent. L. W. Post will take up his residence in Texarkana and give his personal attention to the construction and equipment of the plant and to the operation of the company's business.

Closed Shop Contract Held to Be Valid.

The New York State Court of Appeals, at Albany, has handed down a decision in the case of Jacob vs. Cohen, holding valid an agreement entered into voluntarily by an employer, providing for the employment of union men exclusively. The majority opinion of the court, written by Judge Gray, is concurred in by Chief Judge Cullen and Judges Haight and Werner. Judge Vann wrote a dissenting opinion, concurred in by Judge Bartlett. Judge O'Brien, the seventh member of the court, was ill and absent when the case was decided. Judge Vann in his dissenting opinion says that the Court of Appeals in upholding the contract between the Cohens and the tailors' union reverses itself.

The case is that of Meny Jacobs, president of the Protective Coat Tailors' and Pressers' Union, Local 55, against Morris & Louis Cohen, contracting tailors. The action grew out of a closed shop contract which the Cohens made in employing members of the union four years ago. The Cohens gave a note of $200, which was to be applied to liquidate any damages in case of a violation of the contract. A falling out took place between the union and the contractors later and the Cohens at once made an "open shop" and employed nonunion men. The action was then begun against them for damages under the contract. The defense set up was that the contract with the union was illegal, being against public policy and in restraint of trade.

Justice Garretson in special term of the Supreme Court, in Brooklyn, sustained a demurrer made by the plaintiffs holding the contract was legal. An appeal was then taken by the defendants to the Appellate Division, which reversed the decision of Justice Garretson, holding that the contract was illegal, as the defendants contended. The case was then taken to the Court of Appeals. Judge Gray held that the agreement made by the employer voluntarily with his workmen was not obnoxious on any ground of public policy, and in this connection said:

> If it might operate to prevent some persons from being employed by the firm, or, possibly, from remaining in the firm's employment, that is but an incidental feature. Its restrictions were not of an oppressive nature, operating generally in the community to prevent such craftsmen from obtaining employment and from earning their livelihood. Nor does the answer aver that it was intended to injure other workmen, or that it was made with a malicious motive to coerce any to their injury through their threatened deprivation of all opportunity of pursuing their lawful vocation. To coerce workmen to become members of the employees' organization through such a contract is not the allegation of something which the law will, necessarily, regard as contravening public policy. The allegation that its "purposes are in restraint of trade," or that "they hamper and restrict the freedom of a citizen," or "that they are against public policy," is the mere statement of a legal conclusion.

In giving the dissenting opinion Judge Vann said that a labor trust in restraint of free labor is opposed to sound public policy the same as a trust of capital in restraint of free production. The contract in question was in restraint of free labor and therefore illegal and void. Its primary object was to create a monopoly to benefit the members of a single labor union by compelling the discharge of good men who wished to work, but were too independent to join the union under compulsion, or if they were members already, by compelling them to remain such against their will. While there may have been other purposes they were incidental to this main purpose, which runs through the contract from the first stipulation to the last.

The Fawcus Double Axle Cutting Off and Centering Machine.

The double axle cutting off and centering machine which has been manufactured for some years by the Fawcus Machine Company, Pittsburgh, Pa., has recently been redesigned. An illustration of one of the new machines built for the American Locomotive Company is given in Fig. 1. The appearance of the machine is not materially changed, but the various parts have been modified so as to make the machine practically indestructible and capable of sustaining the abnormal strains consequent upon the use of high speed steel. As may be seen by Fig. 1 the parts are very heavy and substantial. The jaw opening has been increased to 12½ inches and the bed length to admit an axle 10 feet long. The racks and pinions for moving the heads and carriages are now placed in front and are operated by a wrench in front of each head or carriage. The feed screw and nut in the centering head are now covered and entirely protected by a plate, which is screwed on the arm of the centering head. Fig. 2 shows details of the left end of the machine, which is in most respects a counterpart of the other end.

The machine consists of a bed carrying two main head stocks, two tool carriages and two centering drills. Power is applied from a single belt driving pulley through one train of reducing gears to a splined shaft 3⅜ inches in diameter running through the center of the bed. Steel pinions movably splined to this shaft mesh in ring gears on the head stocks. The shaft is supported in bearings at the ends of the bed and the sliding pinions have extended hubs journaled in bearings on the head stocks to relieve the shaft of any tendency to spring under the gear thrust. Each head stock is provided with a two-jaw self-centering steel chuck operated by right and left hand screws by means of gears from a single wrench nut. A section through the chuck is shown in Fig. 2. The head stock bearing on the bed is very large and is scraped to a perfect running fit.

The platen, or main slide, fitted to the bed of the machine, carries the cutting off slide and tool holder on its front and the centering drill on its rear end, each being gibbed to the main slide. The centering drills are driven by belt from an overhead countershaft.

The feed mechanism is belt driven from a cone pulley on the right end of the main driving shaft to a cone pulley on a splined feed shaft carrying bronze worms meshing with steel worm wheels that run loose on the carriage feed screws. A hand wheel keyed to the screw of each tool carriage engages with the worm wheel by means of a clutch, enabling the operator to adjust the tool before applying the power.

In operating the machine a roller on an adjustable stand, not shown in the illustrations, is set on each end of the bed to guide the rough axle through the head stocks. The chucks are then made to grip the axle and the machine started. The machine is driven from a countershaft having two speeds, and when the cutting operation, which progresses simultaneously at each end of the shaft, is half through the second speed is thrown in, accelerating the machine. The increase of speed might be accomplished by using a variable speed motor for the drive, but it has been found that where these machines are used to their fullest capacity the two speeds with the immense power applied to the machine are preferable. After the ends have been cut off, by one motion of the levers the centering drills are brought into exact position and with one or two turns of their hand wheels the final operation is accomplished.

As before stated, no attempt has been made to depart from the conventional type of machine used for this purpose, but every effort has been made to make it more efficient and more durable. All gears throughout the entire machine are of steel, most of them cut from solid forgings, with the exception of the ring gear around each head stock, which is made of gun iron. The head stock gear is shrunk and keyed on the head stock so that if necessary it may be readily renewed. The chucks and tool posts are of forged steel, the former being fitted with hardened tool steel inserted jaws. A hardened plate is fitted to the tool carriage under the tool to better withstand the wearing action of the shank of the tool when in use. The working parts of the centering drills are well protected by strong inclosing parts and are consequently in little danger of being broken. All bearings, including the loose pulleys, are fitted with phosphor bronze bushings.

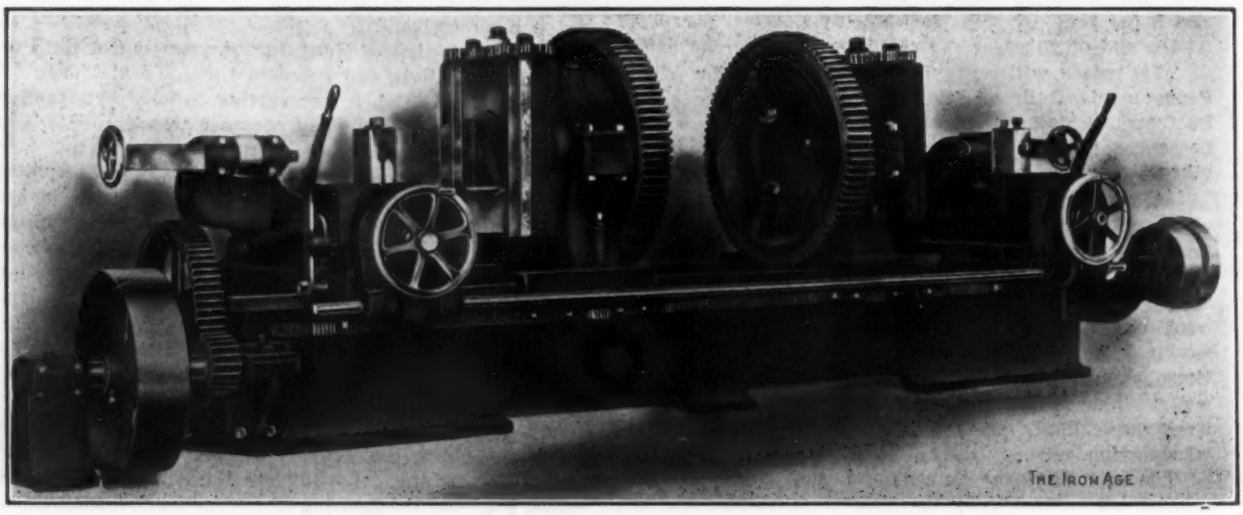


Fig. 1.—The Fawcus Double End Lathe for Cutting Off and Centering Car Axles.

The weight of the machine complete, including the countershaft, is about 15,000 pounds.

The Jones & Laughlin Steel Company Wins Ore Dust Suit.—Judge Robert S. Frazer of Common Pleas Court No. 2, at Pittsburgh, has decided that the law does not give the residents of Oakland and property owners whose holdings are near the Eliza Blast Furnaces of the Jones & Laughlin Steel Company the right to have the company enjoined from operating its furnaces with Mesaba ore, which is the cause of the ore dust litigation. This is the second opinion written by Judge Frazer in the litigation brought by residents of the Oakland and Soho districts to restrain the company from so operating its furnaces as to cause ore dust to fall upon adjacent property. The Supreme Court reversed Judge Frazer in the first suit, which is known as the Sullivan case, but the present action, brought by Mrs. Maud McWilliams, Judge Frazer says does not come within the rule laid down by the State's highest tribunal in the Sullivan case. He therefore dismisses the bill in equity brought by Mrs. McWilliams, but says that the steel company should pay the costs of the case. The nuisance has been abated con-

siderably since the first decision and has now reached such a stage, Judge Frazer thinks, that the adjoining property holders must bear what burdens are incident to a manufacturing community.

The Menominee Range.*

BY JOHN L. BUELL.

It is not generally known that a tradition exists with the Menominee Indians, who were the only inhabitants of this range prior to the discovery of iron ore, that if any member of the tribe should disclose to a white man the existence of a mineral deposit his speedy death was sure to follow. This superstition may have influenced the belated discovery and subsequent mining operations on this range, for by bringing specimens, which they could have so readily obtained, to the trading posts they would have incited earlier investigation. Be that as it may, surely it is incomprehensible why for so many years the existence of ore deposits in such vast quantity should have remained unknown.

Another embarrassment, and one of more substantial import, was the impression that iron ore of quality and quantity could only exist in the Marquette range. The geological formation of other districts where indications of ore were prevalent not corresponding with those of the Marquette district, seemed to preclude the possibility of the existence of paying ore. This impression was general and so effective as to influence the most active and noted explorers, among whom may be included such men as Credner, Pumpelly and Brooks, men of national reputation as geologists.

Dr. Credner, as State geologist, ventured so far as to publish in his report the existence of a large deposit of highly silicious iron ore on section 11, 39-29, and Brooks and Pumpelly, with John Armstrong as guide and woodsman, traversed every section of the lower range when making the selections of lands for the Canal Company. They did no little digging on this and the Metropolitan range, but in no instance did they find any deposits of standard ore. Certainly none which they ever disclosed. The edict had gone forth, "There was no good ore outside of Marquette County," and, burdened with this phantasm they strolled blindly over locations from which millions of dollars' worth of ore have since been extracted and millions more are yet to come.

The location of this district, remote from water and rail transportation, the reported severity of its climate, as also the reported bareness of its soil, all tended to divert immigrants.

Discoveries of Ore Deposits.

In the fall of 1871 the writer, in company with John Armstrong, encamped at the little spring on the present site of the village of Quinnesec. While Armstrong was preparing dinner a little stroll over the bluff to the west disclosed to me the outcropping of the easterly terminus of the Quinnesec mine formation. It was not until the spring of 1873 that the title to this tract was restored, and in May exploration was begun and prosecuted until a deposit of blue ore was discovered August 3 in the same year.

When the ore was first struck it had a width of 11 feet of clean ore, a jasper horse 4 feet in width and then 1 foot more of clean ore. Seventy-five feet east the deposit had a width of 33 feet, running 66 per cent. iron, 4 per cent. silica and 0.013 per cent. phosphorus. In the spring and summer of 1874 55 tons of it were hauled to Menominee on sleds and wagons and smelted in the furnace at that point with a mixture of Jackson hard ore and Winthrop. The last furnace charge was entirely of the Menominee range ore, thus establishing its tractability. Robert Jackson, superintendent of the furnace, spoke in the highest terms of the quality of the ore. This was practically the first test of standard ore from the Menominee range and was the incentive to rapid and successful exploration along the entire formation.

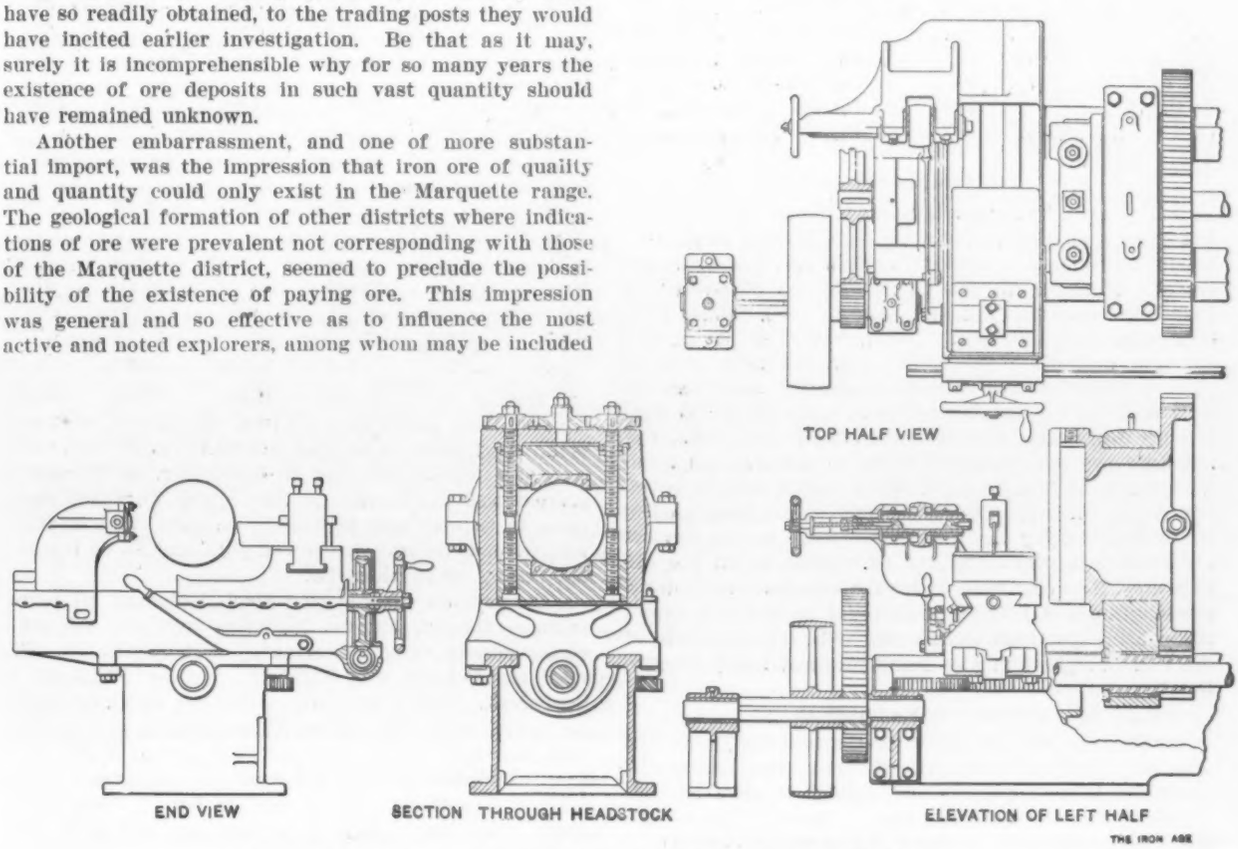


Fig. 2.—Details of the Fawcus Axle Cutting Off and Centering Machine.

The first exploring party to enter the territory embracing the lower Menominee range was headed by N. P. Hulst of Milwaukee. As a representative of the Milwaukee Iron Company he began exploration on section 10, 39-29, the summer of 1872. The exploration was not confined to this point but extended elsewhere, consisting of test pitting and trenching, with the exception of a long drift across the silicious formation on section 10. The exploration was discontinued in the fall of that year.

The mines were discovered from 1872 onward. Norway, Cyclops, Curry, Saginaw and Stephenson were finds in 1878. Breen was found in 1872 and then explored and operated by the Menominee Mining Company, of which Dr. Hulst was manager. Vulcan was a product of 1873, though it did not ship until 1877. Quinnesec was of 1877, as was Emmet. In 1879 came the great Chapin, East Vulcan, Cornell, Keel Ridge and Indiana. Millie came in 1880. To these should be added subsequent and recent discoveries—Pewabic, Aragon, Loretto, Munroe, Traders, Walpole, Vivian and Cundy. Of the foregoing Keel Ridge, Cornell, Indiana, Quinnesec, Cyclops, Emmet and Stephenson are apparently worked out and abandoned. The Indiana closed on account of excessive water

* Abstract of a paper read before the Lake Superior Mining Institute at Iron Mountain, Mich., October, 1905.

and the Cundy is temporarily idle. Saginaw and Breen are being reopened, Hamilton and Ludington have been merged with the Chapin and Curry with the West Vulcan.

The total estimated product for the year 1905 is 2,796,000 gross tons, with a force of about 3000 employees. The product is keeping up if not exceeding former years, with the number of employees somewhat reduced because of the application of improved machinery, underground haulage and improved methods of mining. The quality of the ore produced is not so good as that of former years, yet all produced finds a ready market and no complaints are heard from the operating corporations. The scale of wages is as high as, if not higher than, ever before on the range. This standard of pay, in the face of reduced value of ore, is only maintained by the use of improved machinery and most skillful management in the raising and shipping of the product.

It is estimated that the ore is now delivered on cars at some of the mines at a cost of 60 per cent. less than in former years. When ore was worth from $8 to $12 per ton the operator could afford to be somewhat indifferent as to the cost of production, but with a price of $4 at the end of the market it behooves the management to exercise the utmost economy and skill in the operation of a mine.

The Chapin Mine.

The Chapin, by far the heaviest producer on the range, has underground electric haulage, and shows a total product up to January 1, 1905 (Hamilton and Ludington included) of 13,599,378 gross tons. It was discovered in 1879 and made its first shipment in 1880. Since that date, with the exception of 1892 and 1893, it has been a constant and heavy producer. The ore body consists of a series of lenses extending easterly and westerly 6100 feet, with a varying width of from 50 to 150 feet. The greatest depth reached in the mine is 1460 feet. The standard ore is worked out down to the eleventh level, a distance of 860 feet, yet large bodies remain much nearer the surface. The caving process has been used in this mine, making the mine much more secure against accidents and permitting the extracting of all the ore at a much less cost than under the old system. Under a pressing demand 1,000,000 tons could be annually raised through the Hamilton shaft alone. The immense body of ore still in sight indicates many years of heavy production.

Theories of Formation.

Exploration on this range for the past few years has been quite general, with little success. The question of formation is a perplexing one. Many theories are advanced and each explorer seems to have his own. All seem to conclude that when limestone (so-called) is reached it is useless to prosecute the investigation further. This is in the face of the fact that all deposits of the standard blue ore on the ranges are in the direct longitudinal trend of the limestone—in the limestone, not alongside of it. I know of no diamond drill which has ever been placed on the range with a view to penetrating the formation immediately north of the lime rock. They all drill away from it. Never until the limestone, with a width over all of 4 miles and a length of from 18 to 20 miles, has been thoroughly cut with the drill can any man say that the lower range has been thoroughly explored. With the immense deposit of ore at the Pewabic between two beds of limestone, with the Walpole in the midst of it, with the Quinnesec, Norway, Saginaw and Cyclops and portions of the Aragon in the direct trend of an immense deposit of limestone, who will deny the proposition that the new place to look for standard ore is in the limestone and not alongside of it?

The Connecticut Valley Metal Trades Association held its annual meeting at Springfield, Mass., November 27, when the following officers were elected: President, Richard D. Reed, H. B. Smith Company, Westfield; vice-president, C. P. Fay, J. Stevens Arms & Tool Company, Chicopee Falls; secretary, F. C. Breakspear, A. G. Spalding & Brothers Mfg. Company, Chicopee; treasurer, Springfield National Bank; Executive Committee, F. C. Fieker, Northampton Cutlery Company, Northampton; A. A. Coburn, Coburn Trolley Track Mfg. Company, Willimansett; M. W. Bushnell, G. H. Bushnell Press Company, Thompsonville; T. J. Rider, J. B. Chapman & Co., Springfield.

October Iron and Steel Exports and Imports.

The exports of iron and steel increased considerably during October, according to the report of the Bureau of Statistics of the Department of Commerce and Labor. The total value of all exports of iron and steel and manufactures thereof, not including iron ore, was $12,672,947, as compared with $12,136,378 in September. Taking the commodities for which quantities are given, the following table shows the movement for the month and ten months:

Exports of Iron and Steel.

	October.		Ten months.	
	1905.	1904.	1905.	1904.
Commodities.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	4,606	6,926	40,812	43,354
Scrap	431	2,568	6,560	24.782
Bar iron	1,973	2,506	26,591	24.889
Wire rods	391	475	4,836	1,452
Steel bars	1,168	1,850	18,070	21.605
Billets, ingots, blooms	27.804	12,989	179,780	275,615
Hoop, band, scroll	88	453	3,354	2,608
Iron rails	....	....	....	1,387
Steel rails	30,693	69,380	249,941	342,126
Iron sheets and plates	1,019	512	6,420	3.895
Tin plates and terne plates	428	1,001	6,929	6,383
Structural shapes	6,201	6,199	62,401	43,511
Wire	11,641	13,093	110,271	94,237
Cut nails	564	571	7,202	8,078
Wire nails	2,365	3,120	30.593	2,370
All other, including tacks	356	209	3,478	2,409
Totals	89.728	121,852	757,238	898,701

This table shows that the total quantity of such commodities exported in October was 89,728 gross tons. This compares with 85,969 tons in September, 82,317 tons in August and 67,071 tons in July. The increased movement in October was principally in steel rails, steel billets, wire, structural shapes and pig iron. In no line was the falling off considerable.

The imports of iron and steel, including all manufactures thereof, but not including iron ore, showed a slight gain in value as compared with September. The total for October was $2,255,217, against $2,154,127 in September. Taking the commodities for which quantities are given a decided falling off is observed as compared with September. The total for October was 35,801 gross tons, as compared with 43,264 tons in September, 39,504 tons in August and 36,444 tons in July. There was a sharp reduction in imports of pig iron, bar iron, steel rails, tin plates and structural shapes. Imports of scrap iron and wire rods increased slightly. Details of quantities for the month and ten months are given in the following table:

Imports of Iron and Steel.

	October.		Ten months.	
	1905.	1904.	1905.	1904.
Commodities.	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	18,240	7,044	171,291	68,294
Scrap	3,924	444	12,604	11,801
Bar iron	2,992	1,355	2,919	17,139
Rails	2.272	3,213	16,560	37,444
Hoop, band, scroll	301	98	2,467	1,942
Billets, slabs, bars, steel in forms n.e.s	100	731	1,151	9,579
Sheets and plates	198	160	1,882	3,775
Tin plates and terne plates	3.751	5,033	58,778	61,068
Wire rods	1,726	1,028	14,458	13,062
Wire and articles made from	271	363	3,083	3,372
Structural shapes	1,982	126	9,010	6,894
Chains	17	177	210	309
Anvils	27	24	169	123
Totals	35,801	19,826	294,582	234,802

Importations of iron ore for the ten months ending October reached 709,766 gross tons, against 348,935 tons in the corresponding period of last year. The value of all imports of iron and steel, not including iron ore, for the ten months ending October was $21,820,972, against $18,403,198 in the corresponding period of the previous year. The total value of similar exports this year was $115,576,724, against $105,351,018 last year.

The Secretary of the Navy's Report.

Recommendations Include Two Battle Ships and Eleven Other Vessels.

WASHINGTON, D. C., December 5, 1905.—The annual report of the Secretary of the Navy is largely devoted to an unusually interesting discussion of the policy of the Administration with respect to the increase in the navy and will command the special attention of shipbuilders and contractors in all lines allied with the shipbuilding industry. The total estimates submitted by the Secretary for appropriations to be made at the coming session of Congress amount to $121,565,718, as compared with last year's appropriations of $109,956,679. Through the courtesy of the Secretary the following abstract of his report is presented:

Lessons of Russo-Japanese War.

Within the past two years very impressive lessons as to naval problems of the highest importance have been afforded by the bloody war in eastern Asia, now happily concluded. The war has taught us little, if anything, about the utility of submarines. It has caused, or at least left, much difference of opinion as to the value of armored cruisers, and it has created a still more serious divergence of views respecting the best limit of size for the future battle ship. As a matter of fact, no battle ship of as much as 16,000 tons displacement was used by either belligerent, and while, on the one hand, at least one great power has determined upon the construction of an 18,000-ton battle ship, and others are reported to have in contemplation vessels of from 20,000 to 22,000 tons, on the other, some authorities think these leviathans will prove less formidable and more vulnerable than battle ships of 16,000 tons, such as our contemplated South Carolina and Michigan.

The Department has been caused serious concern by the conflicting advice on the last mentioned question, tendered it by its authorized expert advisers. The general board recommended some time since that the two last mentioned vessels be increased in displacement from 16,000 to 18,000 tons. The board on construction dissents from this recommendation. The general board has further recommended the authorization of three battle ships, to cost approximately $8,250,000 each, and to be of such tonnage as will suffice to secure an armament of at least ten 12-inch guns. The board on construction dissents from this recommendation likewise, and advises instead three battle ships at an estimated cost of $7,500,000 each, with an anticipated armament of eight 12-inch guns and substantially the same tonnage as is contemplated for the South Carolina and Michigan.

After very carefully weighing these divergent views, I feel that it is not as yet sufficiently clear that the larger and more costly battle ships would have such increased efficiency in battle as to justify the certain addition to the public burdens involved in accepting the views of the general board. Unless, therefore, you or the Congress shall direct or otherwise, I shall order the construction of the South Carolina and Michigan on the plans approved by the board on construction. With respect to new ships to be authorized at the present session of the Congress it seems proper, owing to the high authority of both boards, to give their recommendations in more detail, in connection with that of the Department, as follows:

	General Board.		Board on Construction.		Navy Department.	
	No.	Cost.	No.	Cost.	No.	Cost.
Battle ships....	3	$24.750,000	3	$22,500,000	2	$15,000,000
Scout cruisers..	3	6,000,000	3	6,000,000	2	4,000,000
Destroyers	4	3,000,000	..	.....	4	3,000,000
Torpedo boats..	4	400,000	..	.....	..	.....
Submarines	4	1,000,000	..	.....	2	500,000
Gunboat of Helena type	1	600,000	..	.....	1	600,000
Small gunboats.	2	50,000	..	.....	..	.....
River gunboats.	2	160,000	2	200,000	2	200,000
Totals.....	23	$35,960,000	8	$28.700,000	13	$23,300,000

The same reasons which lead me to think it inexpedient to enlarge the dimensions of the South Carolina and Michigan lead me to advise that the battle ships to be authorized be of the type recommended by the board on construction.

It will be observed, however, that I have assumed the grave responsibility of overruling both boards with regard to the number of battle ships and that I have disregarded the advice of the board on construction to make all reductions which economy renders needful in other types. In my judgment the navy needs at least four new destroyers, at least two more scouts and at least one vessel of the Helena type. I retain two submarines or submersibles for the sake of experiment and by reason of their comparatively small cost, and the two river gunboats for the last reason and also for their ascertained utility.

New Steel Floating Dry Dock.

I may here note that in the estimates of the Bureau of Yards and Docks is included a first payment to be made on another steel floating dry dock similar to the Dewey, which is now about to start for the Philippines to fill there a very urgent need of our Asiatic fleet. Rear Admiral Endicott, Chief of the Bureau of Yards and Docks, gives his reasons, in which I fully concur, for recommending the construction of a second floating dry dock and also suggests the desirability of locating it, so far as it is to have a permanent location, at Solomons Island, Md. It may be very desirable under certain circumstances to send a dock to our fleet instead of sending our fleet to a dock, and the Department always feels some reluctance in sending ships which are to remain in commission to a navy yard, for there is always more or less uncertainty when they will again become available for active duty.

Shipbuilding Policy.

There has been of late much discussion in the press and elsewhere as to the advantages and disadvantages for the United States of a large navy and as to the proper limits to be set to the extension of our navy.

With regard to the first of the two above mentioned problems the material question, fairly stated, is not How large a navy do we want? but With how small a navy can we be safe? since we may be assured that in any event our navy will be, considering our resources, our interests and our national duties, a very small one compared with those of other nations of the same class.

The second problem can be determined only provisionally. If circumstances remain as they now are I see no reason to suppose that the number of ships in our navy need increase; on the contrary, it is reasonable to anticipate that their number will be reduced, and even reduced materially, within the next five years. What is more important, however, than the mere number of ships on our register is the size of our fighting fleet, and here again, supposing that no developments at present unforeseen occur in the factors of the problem, it seems probable that no increase, but on the contrary some slight reduction, may be anticipated within the period above mentioned in the number of vessels composing this fleet. In other words, the aggregate of our battle ships, armored cruisers and coast defense vessels, building or authorized, would seem, according to present indications, sufficient to provide for any contingencies within the limits of probability.

New Vessels to Displace Old.

This statement, however, must not be misunderstood. It does not at all mean that we should give up building new ships; on the contrary, the necessity for vessels of an improved type, to take the place of those now recognized as obsolete, or evidently destined to become such, has grown plain and urgent.

While any discussion of our future needs and the proper means to meet them must be, of necessity, largely conjectural, I think it may be safely said that if the situation is not complicated by any unforeseen developments our programme of naval construction for the future, in so far as it relates to our fighting fleet alone, should consist in substituting five new battle ships and two new armored cruisers for the oldest vessels of these types on our register and five more battle ships for the ten coast defense vessels of the monitor type, and that these

substitutions should be made, at latest, within the next six years.

Fleet Colliers.

It became evident soon after the authorizing of the two fleet colliers provided for at the last session of the Congress that it would be impossible to construct these vessels at Government yards within the limits of cost provided by the appropriation. Inasmuch as the law required that they should be built at Government yards, the Department had to choose between incurring an expense which, when the appropriation was exhausted, would leave them incomplete, and thus practically compel a further appropriation beyond the amount fixed by the Congress, or not undertaking them at all; it promptly chose the latter alternative.

In the estimates for this year an increased sum is asked to make possible their construction at Government yards. I think it right to say, however, that in my judgment, the place and method of construction of all ships should be left invariably to the discretion of the Department. Our private shipbuilding plants are of great importance to our national defense, and it has been found by experience that, ordinarily, vessels can be built at less expense and more rapidly in private than in Government yards. The Department, however, ought always to have the authority, which has been usually granted it, to build, in its discretion, in Government yards, as a protection against extortion or unlawful combination on the part of shipbuilders. W. L. C.

A Large Gas Power Plant in a Cement Works.

The Iola Portland Cement Company, Iola, Kan., is about to increase the capacity of its already large gas power plant. An order has been placed with the Westinghouse Machine Company, East Pittsburgh, Pa., for three 500 horse-power horizontal double acting gas engines and one 125 horse-power vertical single acting gas engine. The three horizontal gas engines will be the first of this type to be installed in the power house, the others being of the vertical type. After the installation of the engines now ordered the power equipment will comprise 15 engines of the Westinghouse vertical single acting type and three of the horizontal double acting, aggregating about 4500 horse-power.

The company operates its plant with Kansas natural gas fuel and is one of the largest users of gas power in the cement manufacturing field. The engines are used to operate various machinery, such as rock crushers, rotary kilns, lines shafting, and generators for supplying power and light. The machinery is in general arranged in groups upon sections of countershafting, each driven by a single engine, either directly connected to the shaft or connected with it by rope drive. In point of size this installation has few equals and its successful operation under severe conditions demonstrates the many advantages of gas power in industrial establishments of all kinds.

Forced draft appeared some years ago in danger of being abandoned for all ordinary work because of frequent complaints regarding its effects in burning out the grates, injuring the boilers and blowing gas and smoke from the fire doors into the fire room. It has since been demonstrated that these difficulties were due to the fans being too small for their work, requiring them to be operated at far above their normal speed. This caused an ash pit pressure of from 5 to 10 inches of water where only ¾ to 1¼ inches is required. Later and more accurate knowledge regarding the proper application of the fan blower for this purpose has resulted in restoring the system to its former measure of popularity. When it is used the air passing from the ash pit to the combustion chamber is greatly reduced in pressure, due to the resistance of the grates and fuel, while the stack tends to create a partial vacuum in the furnace. It is thus impossible to maintain more than a slight excess of pressure in the combustion chamber and this should not be forced, as was formerly the case.

Modern Forging Methods.

It is only within the last few years that any system has been attempted in the manufacture of the various forgings used by the engine and machine trade throughout the country. There was a time when forgings were made out of any piece of steel that happened to be handy,

BILLET NO. 1875 STOCK R — SIZER FORGE CO., BUFFALO N.Y.
MILL (C) — MILL HEAT NO. 1857694
TEST # 186 — 10/14/05

SIZE	CARBON	SULPH.	PHOS.	SIL.	MANG.
7"x14"	0.29	0.032	0.034	0.045	0.58

THE IRON AGE

Fig. 1.—Card with Chemical Analysis of the Billet.

REPORT OF TEST NO. 186 — 10/19/05 — SIZER FORGE CO., BUFFALO N.Y.
SIZE OF BILLET 7"x14" — NO. 1875R — CARBON 0.29

TENSILE STRENGTH	ELASTIC LIMIT	REDUCT. OF AREA	ELONGATION.
71200#	38500#	32%	27½%

THE IRON AGE

Fig. 2.—Card with Test of the Billet.

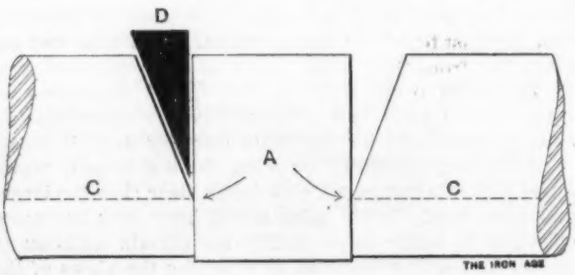


Fig. 3.—A Step in the Old Process of Making Crank Shafts.

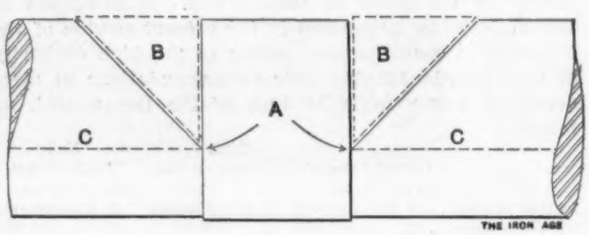


Fig. 4.—The New Process for the Same Operation.

a piece nearest to the size of the forging being used, and at that time a great deal of Bessemer stock was used on account of its cheapness. The past few years, however, have wrought many changes and now this business is carried on carefully and systematically. The different operations and methods described herein are a part in the system which has been developed at the plant of the Sizer Forge Company, Buffalo, N. Y.

All billets as they are received are numbered in consecutive order and a card, Fig. 1, with the corresponding number is placed in a card index in the office. This card gives the number of the billet and a mark designating the mill from which it was shipped and also a very complete chemical analysis. This latter is very important, as it is from the chemical analysis that the forge foreman determines what billet to use for a certain class of work. A test is made from each different mill heat of steel received and recorded on a card, Fig. 2, which is also kept in a card index. Thus by referring to the billet number the test number can be determined and by referring to the test card the physical properties of the steel are shown in detail. This does away with the likelihood of an improper grade of steel being used for any order. The system also insures an absolute uniformity of steel, and all of the forgings on an order will be alike and not some hard and some soft as is too often the case.

The heating of the billet before it is forged has become one of the vital points in making a forging. When the billets are heated to too high a temperature it is apt to make the completed forging brittle and likely to break on receiving sudden shocks. This it is particularly important to avoid in the manufacture of gas engine crank shafts. It is the custom now to allow three or four heats on a forging which formerly was made in two heats and not to heat the billet to a high temperature nor hammer it after it has started to get cold.

All crank shaft forgings after being forged are placed in a special annealing furnace in which they are brought to a dull red heat and then allowed to cool slowly until they are cool enough to be machined. This annealing takes up all the working strains of the forgings and leaves them extremely tough and of a uniform hardness throughout.

A very essential point in obtaining satisfactory re-

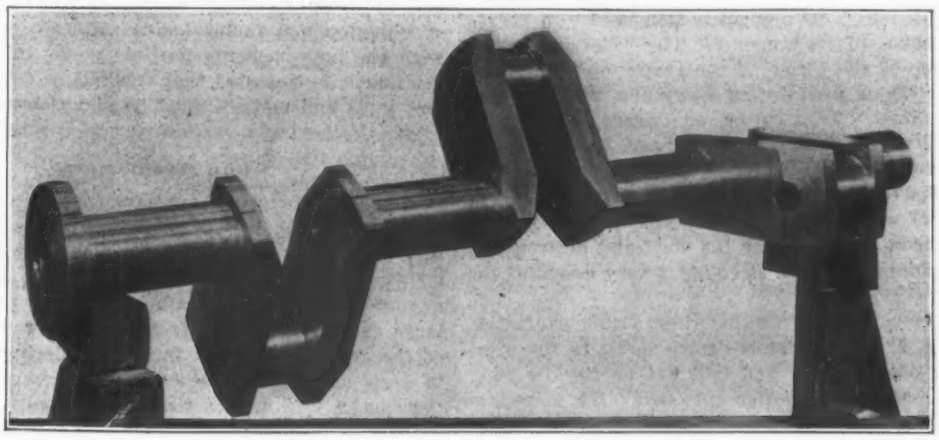


Fig. 5.—A Large Three-Cylinder Marine Crank Shaft.

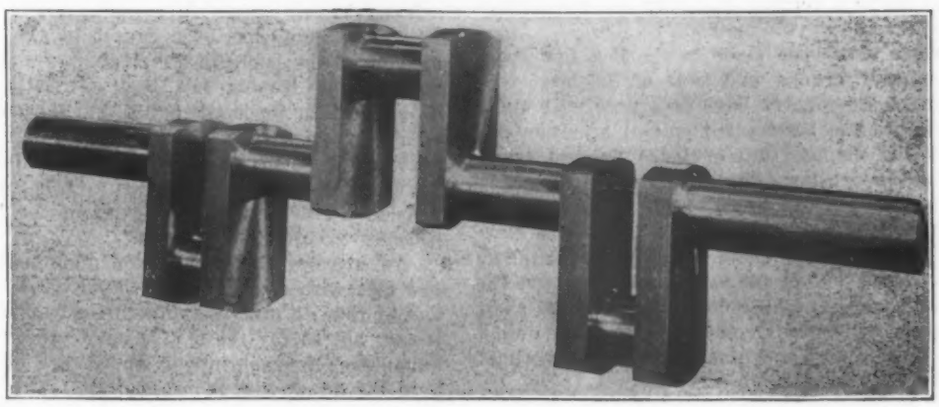


Fig. 6.—A Three-Cylinder Ice Machine Crank Shaft.

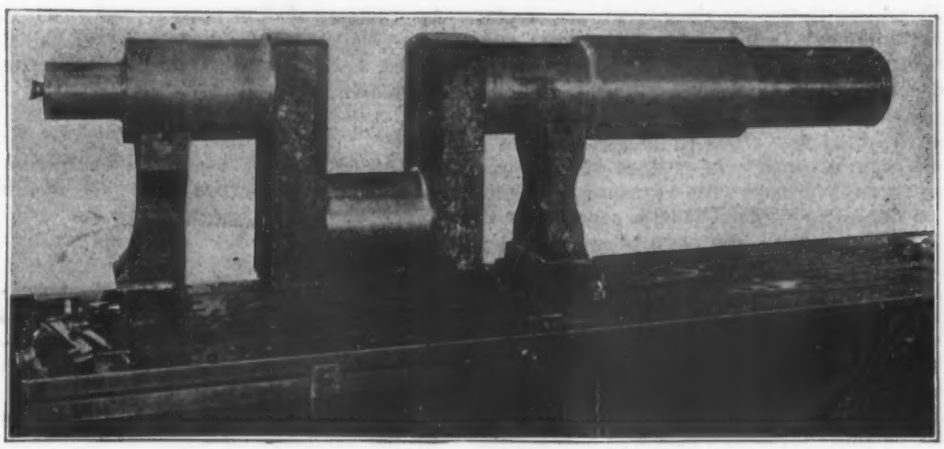


Fig. 7.—A Single Cylinder Ice Machine Crank Shaft.

sults in the manufacture of forgings, and especially of crank shafts, is the using of a sufficiently large and heavy hammer so that at each blow the center of an ingot or billet and not the outside only is thoroughly worked. All forgings are greatly reduced in size from the original billet—that is, a billet is used very much larger in cross section than the finished forging is to be. This insures a thorough working and manipulating of the material under the hammer.

Fig. 3 illustrates the old method of making a crank shaft from a billet. This method is still used to a great extent on account of its economy. The billet is drawn out to the size of the throw of the crank and a wedge shaped cutter, D, is used to cut away the stock at the side of the throw. This cutter, or former, forces the material back away from the throw and the cutter is then withdrawn and the billet is drawn down to the size of the shaft of the crank shown by dotted lines C. This method of wedging the material away from the outside of the throw tends to tear the steel and destroy its fiber at the points A where strength is very essential to crank shafts.

The modern method of forging these crank shafts is shown in Fig. 4. The billet is drawn down to the size of the throw of the crank and laid flat on the die and the hammersman with a cutter cuts away the material shown in the inside of the dotted portions B. The billet is then drawn down to the line of the shaft C and the crank shaft is completed. This practically does away with all tearing at the points A, and while it costs a little more to make a forging this way the results are very much superior to the old method.

Rapid strides have been made in the last few years in the machining of cranks and most of the large concerns throughout the country have kept pace with these improvements. At the Sizer plant special attention has been paid to the manufacture of large finished crank shafts. Fig. 5 shows a large three-cylinder marine crank with solid forged steel couplings. Eight of these crank shafts were recently made for the United States Government, being finished complete ready to be installed, including the boring out of the shafts and pins and the boring of all oil ways and oil holes. Figs. 6 and 7 show a large three-cylinder ice machine crank shaft and a large single cylinder ice machine crank shaft, both of which were finished complete in every respect.

The Western Malleable Steel Company.—This company, which some time ago purchased a large tract of land at Detroit, Mich., adjoining the main line of the Wabash Railroad and facing the river front, has erected the following buildings: Foundry, 75 x 125 feet; core room department, 50 x 50 feet; annealing room, shipping, cleaning and chipping room and office, 75 x 200 feet, the front of the second story to be used as a pattern shop; pattern vault, 50 x 50 feet. The equipment includes a Colliau cupola, with a capacity of 50 tons of gray iron castings a day; a steel furnace, with a capacity of 20 tons a day, and an annealing furnace, with a capacity of 60 tons of steel castings a day. The plant is operated electrically, using four General Electric motors of 25 horsepower each. Ground was broken October 28 and the buildings were completed November 21, the first shipment of castings being made the 25th. The company will make high grade light steel castings for pneumatic tools, automobiles, gas engines and other purposes where castings of a homogeneous and tough nature are required. Orders have been booked ahead covering a period of four months. The Western Malleable Steel Company is incorporated under the laws of Michigan, with a capital of $55,000. N. M. Kaufman of Marquette is president, C. E. Gordon vice-president and S. R. Kaufman of Marquette secretary-treasurer.

The Donald Steamship Company, owned by New York capitalists, has just placed orders in England for the building of two new steel vessels, to be put into service in the fruit trade between the West Indies and Central America and the United States. The contracts for these vessels have of course been placed abroad because they can be built more cheaply there than in this country.

The Naval Ordnance Bureau's Report.

Large Appropriation Asked for Gun Factory.

WASHINGTON, D. C., December 5, 1905.—Admiral N. E. Mason, chief of the Naval Bureau of Ordnance, in his annual report to the Secretary of the Navy, call attention sharply to the inadequate facilities of the Government to manufacture guns as rapidly as they are needed and asks for an appropriation of $3,300,580 to put the Washington gun factory on a satisfactory basis. Even with the improvements possible under this large appropriation it is conceded that one-half or two-thirds of the new guns and mounts must be manufactured by private firms. Following is an abstract of the report:

Gun Manufacture.

The manufacture of guns for the new ships has made good progress during the year, both at the naval gun factory and at the various private manufacturing establishments. It has become the policy of the Department to manufacture a certain portion of the guns and mounts of large caliber at private factories, the crowded condition of the work at the gun factory rendering it impossible to keep up with the necessary changes and repairs in the service and at the same time supply all the outfits for new ships, and also because it is considered advisable to encourage and foster this kind of work at other places than Government yards, in order to have them available for the manufacture of ordnance outfits when urgency arises.

Some trouble has been caused by the rapid wear or erosion of the bores of the high powered large caliber guns. This trouble has been partially remedied by changes in the projectile bands, but it is only a question of a very short time when it will be necessary to withdraw these guns from the service for a time for the purpose of relining, and in order to keep vessels in commission a reserve supply of guns of the larger calibers becomes absolutely necessary.

An attempt to develop a semiautomatic 3-inch gun has met with some success. Four types submitted for test by four different manufacturing companies have been tested, but so far the test has not proved definitely the advantages for continuous aimed fire of any of them over the 3-inch gun in present use. This test is in the hands of a board of expert naval officers and it is hoped that a definite conclusion will be reached at an early date.

Difficulty has been experienced by the manufacturers in providing shell of large caliber which fulfill the severe requirements of the bureau as to ballistic test. It is hoped, however, that a further development of existing types will produce such shell.

Armor.

During the past year the manufacture of armor has progressed most satisfactorily, the monthly rate of delivery showing a marked increase over any previous year. The high standard of uniformity and excellenee under ballistic test with capped projectiles previously noted has been sustained and the bureau believes that the armor now supplied is at least equal in that respect to that produced in any country.

Despite the marked increase made in the monthly rate of delivery of armor, the bureau continues to receive complaints from shipbuilders that delays are being occasioned by the nonreceipt of armor as rapidly as it can be installed on vessels. These complaints refer particularly to the later vessels contracted for and are principally the result of a gratifying competition between the builders that is evidenced in an unprecedented progress made in structural work.

During the year 18,690 tons of armor have been delivered, leaving under all outstanding contracts 19,925 tons still to be completed.

It is believed that early in the next calendar year the Carnegie Steel Company and the Bethlehem Steel Company will have practically completed the casting and forging of all armor yet to be delivered by them, and under the present rate of delivery all outstanding contracts should

be completed within approximately 14 months. It is to be regretted that this early completion of existing contracts, with the limited demand for further armor that is at present in prospect, may cause the firms now prepared to manufacture armor to feel it necessary to seriously, and perhaps permanently, curtail their present facilities and divert their energies in other directions.

The development of the increased facilities of the Midvale Steel Company for the manufacture of armor plates of all sizes and design, noted in my last report as in progress, has been completed, and the company is about completing further installations that should still more increase the possibilities of its output. In December, 1904, the bureau ballistically tested for this company experimental plates representing its proposed class A and class B armor. These plates showed very satisfactory characteristics and indicated the ability of the company to manufacture plates that would meet the bureau's specifications in all respects. On July 27, 1905, this company submitted for regular test a plate of class A armor, representing the first ballistic group to be completed under its contract of December 15, 1904. This plate passed the required test with marked success and the company was enabled to commence its delivery of armor well within the contract requirements.

Proposals for furnishing the armor required for the two battle ships authorized by the last Congress have not been called for, but the bureau will be prepared to issue advertisements for such proposals as soon as the characteristics of these vessels have been determined upon.

The Washington Naval Gun Factory.

The conditions have finally become such at the naval gun factory at Washington, D. C., that it is now found impossible to keep up with the current work of the navy, even working continuously day and night as many men as can be employed. The bureau has found it necessary to enter into contracts with two of the largest armor making and gun forging plants for the manufacture and delivery of the completed guns and mounts of some of the later vessels authorized by Congress. It is considered that though all of the recommendations of the superintendent of the gun factory for increasing the size and capacity of this establishment are carried out even then, with the navy increasing as it is, the gun factory would be unable to make more than the necessary repairs and changes and supply the necessary outfits to vessels in the service and building, and at the same time manufacture one-third or perhaps one-half of the new guns and mounts, leaving the remainder to be manufactured by contract by outside firms, provided that the gun factory carried out its work on the one-shift eight hours per diem practice. This would keep at least two large firms in touch with the navy work and at the same time the gun factory would not be working at its full capacity; then in times of emergency, by working full time night and day, a much greater output could be delivered and delays not be caused.

The superintendent of the naval gun factory recommends that the following improvements in the plant of the naval gun factory be made:

New machinery for existing shops	$150,000
New brass, iron and steel foundry	300,170
Machinery, &c., for proposed foundry	121,075
New pattern shop building	300,160
Building for new sighting shop	87,000
Machinery for proposed sight shop	150,000
Building for shop for medium and small guns	190,800
Machinery for proposed gun shop	368,930
New Forge shop building	134,937
Machinery for proposed forge shop	148,000
Extension of gas plant	9,961
Locomotive house	61,747
Machinery for locomotive house	12,000
Steel shed for timber	40,320
Fire proof pattern storehouse	156,000
Extension of east and west gun carriage shops	334,448
Machinery for proposed extension	660,232
75-ton locomotive crane	16,000
Fourth battery of boilers (5300 horse-power), completing the plant	50,000
Muster house and closets	8,800
Total	$3,300,580

While the bureau considers the above mentioned improvements recommended by the superintendent of the gun factory as very necessary to increase the efficiency of the factory, it is realized that in all probability such a large appropriation cannot be obtained this coming fiscal year. It therefore urgently recommends that the appropriation for the purchase and erection of new and improved machinery for existing shops and the appropriation for the brass, iron and steel foundry, together with the necessary machinery, &c., be made, and as much of the remaining appropriations be granted as is possible.

W. L. C.

Pacific Coast Trade Notes.

SAN FRANCISCO, CAL., November 25, 1905.—We have experienced an unusually long period of dry weather this fall, which has had the effect of producing more or less dullness in business circles throughout the State. Some of the large houses in the State continue to report big sales, but others complain a great deal, and the community as a whole was beginning to prepare itself for a dry year with all that it implies. But the rains that have fallen during the past week were very general, and although the precipitation was not very great the ground in the northern part of the State and in the great interior valleys has been made ready for the plow and the farmers will be pretty busy for some weeks. This of itself will sell seasonable articles in the line of hardware and agricultural implements and in this manner be of benefit to the trade. It cannot be expected, however, that there will be any great revival of activity now until after the new year except for those articles which are required by particular lines of business.

As regards building operations, there has been an unusual activity, which is still continued, and building hardware is in better demand than has ever been known in the State. Oregon and Washington have had a great harvest and improvements are the order of the day in both States. Hence the jobbers of hardware in Seattle, Tacoma, Spokane and Portland will have an unusually good year.

There has been great activity in shipbuilding on Puget Sound, Humboldt Bay and the Columbia River and in San Francisco, generally in building vessels for the lumber trade in fir and redwood, and the supplies for them have been in active demand. The machinery for all of them is supplied from San Francisco when they happen to be steamers or steam schooners, and they have to be towed down to this city in such case. Hence there has been quite an active time among our foundries and machine shops.

A great deal of mining machinery is going hence to Mexico. As the mining interests there are largely developed by American capitalists, large quantities of machinery will be taken from this country and if San Francisco manufacturers are alive to their opportunities they will be able to secure their share of it.

The Mongolia, which cleared for China and Japan November 15, had a cargo valued at over $1,400,000, nearly $1,000,000 worth being for Japan, much of it consisting of machinery. The last steamer to Panama took out a consignment of gang plows for Cadiz, Spain. The China, which cleared to-day for the Orient, has a large quantity of machinery, principally for Japan.

J. O. L.

The use of denaturized alcohol as a motor fuel was discussed at a meeting of the Automobile Club of America, in New York, November 28. The advantages in the use of alcohol for motors were referred to—its cleanliness, safety and freedom from disagreeable odor. While there is no limit to the supply of alcohol, the problem of future gasoline supply at the present rate of consumption was said to be a serious one. It was brought out that the average production of gasoline in this country is about 40,000,000 gallons, of which half is exported. As showing the demand for gasoline in the United States, it was stated that in the four States of New York, New Jersey, Massachusetts and Connecticut there are as many automobiles as in all France, while in the United States there are more automobiles in use than in the whole of Europe.

The New Hamilton High Speed Corliss Engine.

The term "high speed" as applied to the new Corliss type of engine made by the Hooven, Owens, Rentschler Company, Hamilton, Ohio, requires some explanation. It must not be confused with high speed as applied to the ordinary slide valve and automatic engines, as the speed of the new engine ranges only from 125 to 200 revolutions, which, however, is high for engines having valves of the Corliss type. The engine was designed to fill the demand for an engine approaching Corliss economy with as near as possible the steam distribution obtained with releasing gear adapted to such work as the direct driving of alternating current generators, which for a given periodicity may be constructed cheaper the higher the speed. The engine has many advantages over the ordinary high speed type and fills the gap which has heretofore existed between engines of that class and slower speed Corliss engines. There are several distinctive features, among which are the bed frame and cross head guides, which are in one casting having a bearing on the foundation for its full length; the cylinder, which is not overhung, and the valve gear, which does away with the wrist plate universally used with Corliss valves.

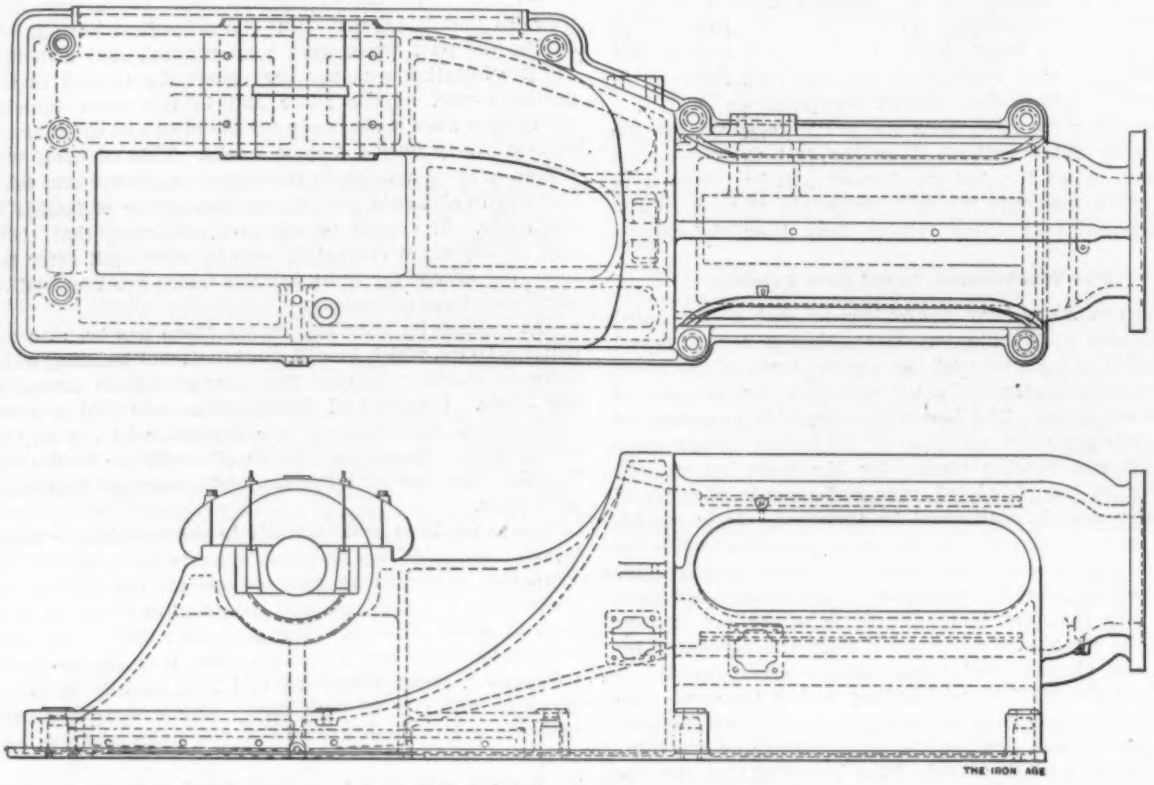


Fig. 1.—The Bed Frame and Cylindrical Cross Head Guides of the Hamilton High Speed Corliss Engine.

Some of these special features are illustrated herewith. Fig. 1 shows a plan and elevation of the bed frame and guides, which it will be seen is of tangye form, with an oil retaining flange around its entire base. The single piece cored frame is of graceful lines suggestive of strength and rigidity and is brought down to the floor its entire length. This engine is entirely different from the ordinary high speed engine, which is usually made up of the center crank and subbase type. It is of the side crank pattern, hence is much more accessible around the crank end than the center crank high speed type. The troubles of keeping the bearings in alignment are also avoided. The bearings are fitted with quarter boxes of the form used in the Hamilton-Corliss engines, which make it practically impossible for the shaft to get out of alignment. The bottom box is removable by rolling around the shaft, when the weight of the latter is taken off from it and the side quarter boxes and wedges are removed. The bottom box is arranged for water circulation and rests in a bored way. The main bearing and the cylindrical guide part of the frame are bored and faced simultaneously in a special horizontal boring machine of Niles make, so that the accurate relation of these parts is assured at the outset. The cylinder sets on a base which is entirely separate from the frame, and is not overhung like the usual high speed engines.

Side and end elevations of the cylinder showing the valve gear are given in Fig. 2, and a diagram of the connections for operating the steam valves in Fig. 3. There are separate eccentrics for the steam and exhaust valves, and the connections are direct from the rockers to which the eccentric rods attach, without the intermediary of wrist plates. Eliminating the wrist plate in the valve gear reduces the number of parts and greatly reduces the weight of the valve gear and makes it much more adaptable for high speeds. The valves are packed with a new type of patented metallic packing, placed on the interior of the cylinder, as it requires no inspection or attendance, which does away with the ordinary packing troubles and permits reducing the length of the valve stem brackets, allowing the valve gear to be placed much nearer the cylinder. This is also claimed to eliminate the vibration usually found in four-valve high speed engines.

The metallic valve stem packing is something entirely new and is said to be much better than the ordinary type of metallic packing, inasmuch as there are no stuffing boxes on the outside of the cylinder.

Fig. 4 shows the mechanism of the governor, which operates directly on the steam valve eccentric. The construction of the governor is such that it is much smaller and lighter in weight than the ordinary governor of this type and is also much more powerful. Its center of gravity is at the center of rotation. Hence it is not necessary to counterweight the fly wheel, and the usual troubles due to unbalanced governors are entirely avoided. The weights are limited in their outward movement by the contact with the shaft of the ends of an oval shaped opening in the steam eccentric. In the inner position of the weights lugs on the arms arrest the movement. Referring to the diagram of the valve motion in Fig. 3 it will be seen that the line marked "governor in" intersects the horizontal line A B C at D, the distance of which from A is about 75 per cent. of the distance A B. This

represents the maximum cut off, which is three-quarters of the stroke.

If the engine is running with the governor in its inner position—that is, under its maximum load—the movement of the valve is as represented by the solid line, showing an early and rapid movement to full opening at E, a well sustained opening and a rapid closing at cut off D. The closing motion continues until the valve is fully lapped at the beginning of the return stroke of the piston, during which the valve is nearly stationary until just at the end, when it suddenly starts to open quickly

right hand valve in Fig. 3 is in the position of edge and edge and the heavy solid lines show the positions of the rockers. The crank pin is slightly above its dead center and if the governor weights are in the eccentric has its maximum throw. Further movement of the rocker H to the right opens the valve and it will remain open while the eccentric moves the rocker to K and back to the position H, when the cut off will take place. During the remainder of the revolution, while the rocker moves to M and back to H, the valve will be lapped. As an illustration, if the governor weights are in their outer position

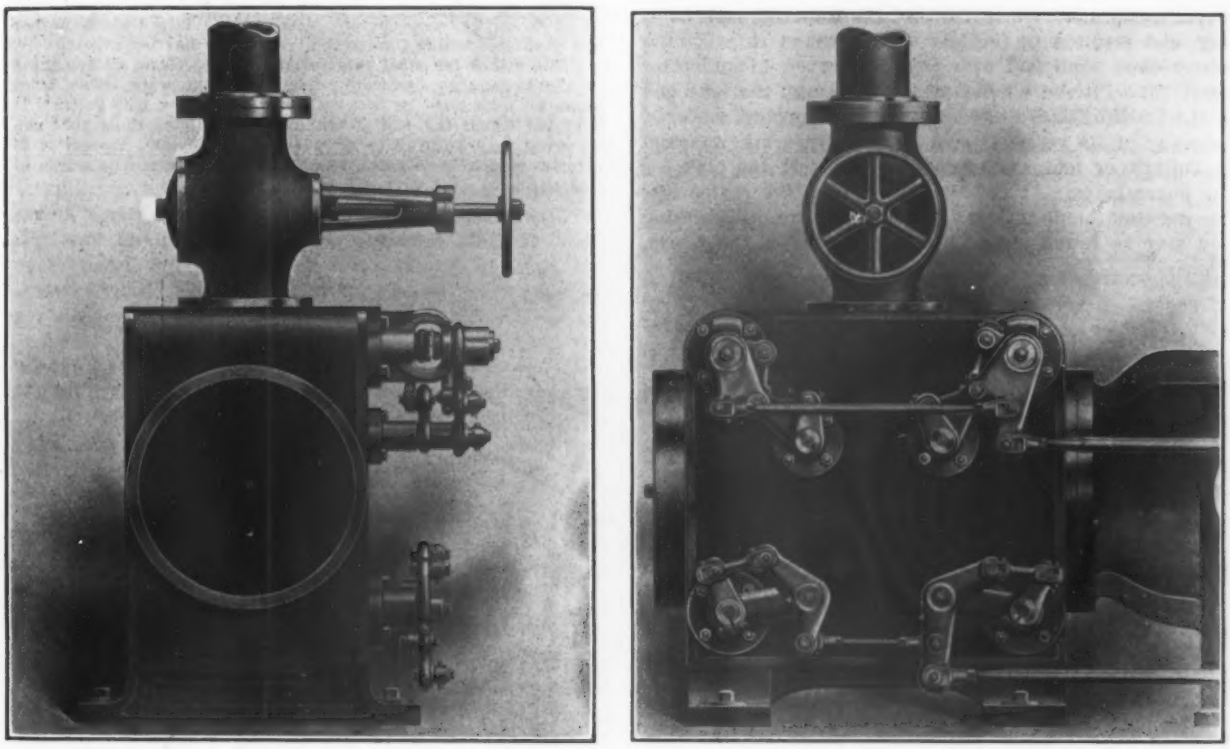


Fig. 2.—End and Side Elevations of the Valve Gear.

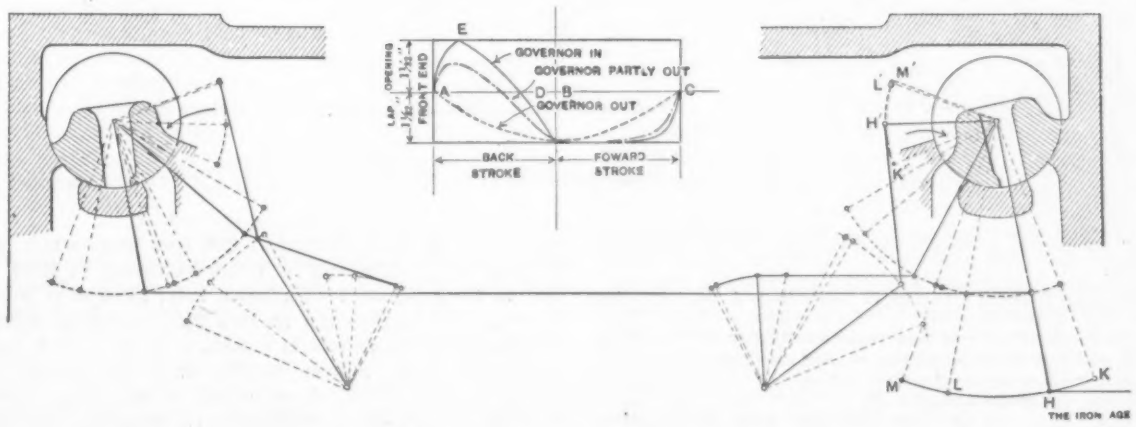


Fig. 3.—Cross Sections of the Steam Valves, Indicating the Rockers and Connection and Diagram of the Valve Movements Corresponding to Different Governor Positions.

to admit steam again on the back stroke. If the speed of the engine increases the governor weights overcome the tension of the spring and tend to assume the position A, Fig. 4. This movement of the weights swings the steam eccentric about the fixed pin B in the wheel and pulls the center of the eccentric from the position D to the position E, reducing the throw. The result of this movement of the eccentric can be best seen by referring to the small diagram in Fig. 3, where the broken line represents the valve movement with the governor weights out and the valves are not opened at all. An intermediate position of the governor weights causes an early cut off, as indicated by the dot and dash line. The

the throw is reduced and the rocker does not pass the position H, hence the valve does not open, but simply comes to edge and edge and goes back again, its motion being as shown on the diagram by the dotted line. If the governor is midway of its throw the position H of the rocker will be passed, but it will not reach the position K and the cut off will occur earlier. The movement of the governor changes the stroke and the angle of the eccentric, varying the cut off and keeping a constant lead. H K represents the opening of the valve and H M the lap movement. From this one might expect a tremendous lap movement of the valve on its seat, but the double distortion produced by the two sets of levers

has reduced this so that the actual lap movement is no greater than the opening.

This new type of engine is to be made in sizes ranging from 10-inch cylinder diameters by 21-inch stroke up and for all speeds between 125 to 200 revolutions per minute.

Lake Shipping News.

Many Vessels Founder in a Storm.

DULUTH, MINN., December 2, 1905.—The most severe storm in its history swept over Lake Superior last Tuesday and resulted in the loss of more steel ships of the newer class than had ever been destroyed in an entire year. The Pittsburgh Steamship Company, the lake end of the United States Steel Corporation, was chief sufferer, as many of its vessels were on Lake Superior upbound to Duluth, or had within a few hours left the port for the lower lakes. At the time of writing the entire loss has not been made up, for a barge or two are still missing and may be found later. The net results of the storm, so far as the corporation is concerned, seem to be as follows:

Steel ship Lafayette, valued at $225,000 and 454 feet long, a total loss. This ship went on the rocks about 40 miles northeast of Duluth, and in less than ten minutes after striking broke in two and the parts separated at once; so rapidly, in fact, that men could scarcely get from one end to the other. This was one of the ships built by the Carnegie Steel Company in 1900 and was one of the very finest and most stanch vessels of the entire great lake fleet.

Steel ship Mataafa, valued at $240,000 and 430 feet long, a total loss. This ship had left Duluth with her consort a short time before the storm and had been compelled to turn back. On reaching the harbor entrance the consort was dropped and laid at anchor outside through the entire storm, while the big steamer attempted to make port alone. The ship, though loaded with 6000 tons of iron ore, was so light a plaything for the waves that they lifted her and dropped her with terrific force on the bottom at a point close to the harbor piers and where the water ordinarily was more than 30 feet deep. On account of this she could not make the piers, and drifted on the beach 500 feet from shore and at a densely populated part of the city. It was impossible for the life saving crew to reach the ship until the next day, and in the meantime she had broken in two and nine of her crew of 24 had been killed by cold, water and exposure and were found incased in ice.

Steel ship Wm. Edenborn, built in 1900, valued at $255,000 and 498 feet long, possibly can be released and rebuilt, though at heavy expense. This ship went on the rocks of the north shore, 40 miles northeast of Duluth. Wrecking operations have already commenced and the salving of the ship will depend somewhat on weather conditions for the next few days.

Steel barge Madeira, consort of the Edenborn, also lost 44 miles from Duluth. She was valued at $175,000 and was 436 feet long. This ship was built in 1900. She is a total loss.

Steel barge Manila, built in 1899, valued at $155,000 and also 436 feet long, probably can be saved. This ship was consort for the Lafayette.

Steamship Crescent City, valued at $210,000, 406 feet long and built in 1897, went ashore at the Duluth city pumping station and can perhaps be saved.

The corporation's flagship Wm. E. Corey, valued at $300,000 and 578 feet long, went ashore near Ashland and is being released.

Steel ship Coralia, 413 feet long, and consort Maia, 376 feet long, valued at $220,000 and $135,000 respectively, went ashore and are being released.

Steel steamship I. L. Ellwood, valued at $255,000 and built in 1900, struck the concrete piers coming into Duluth harbor and sank just inside the harbor. This ship has been raised.

This makes ten steel ships of the largest class, all belonging to the Pittsburgh Steamship Company, that were either total losses or were more or less seriously injured by this storm. It is probable that the cost of salving and repairing those that can be saved may amount to an average of $50,000, though it is utterly impossible to make anything more than a wild guess at this time.

Other vessels wrecked during the same storm at the head of Lake Superior were R. W. England, out this year, valued at $200,000 and 398 feet long, which was driven half a mile out of water sufficient to float her but is being released with small loss; steel ship Monkshaven, built in Scotland in 1882 and valued at $70,000, went on Pie Island and is a total loss, the owner being the Lake Superior Corporation, Sault Ste. Marie, Ontario; wood steamship George Spencer and barge Amboy, valued at $35,000 and $12,000, respectively, are total losses at a point about 40 miles from Duluth, being the property of the Tonawanda Iron & Steel Company; steel ship Bransford, valued at $240,000 and 450 feet long, was stranded on Isle Royale and can probably be saved. In addition to these a number of smaller and less valuable vessels were lost on other lakes. The total losses by this one day storm will probably amount to not less than $1,750,000. The Pittsburgh Steamship Company carries no insurance on account of the size of its fleet and the varying ports at which the vessels trade. Even with this loss the company's insurance sinking fund is far from wiped out.

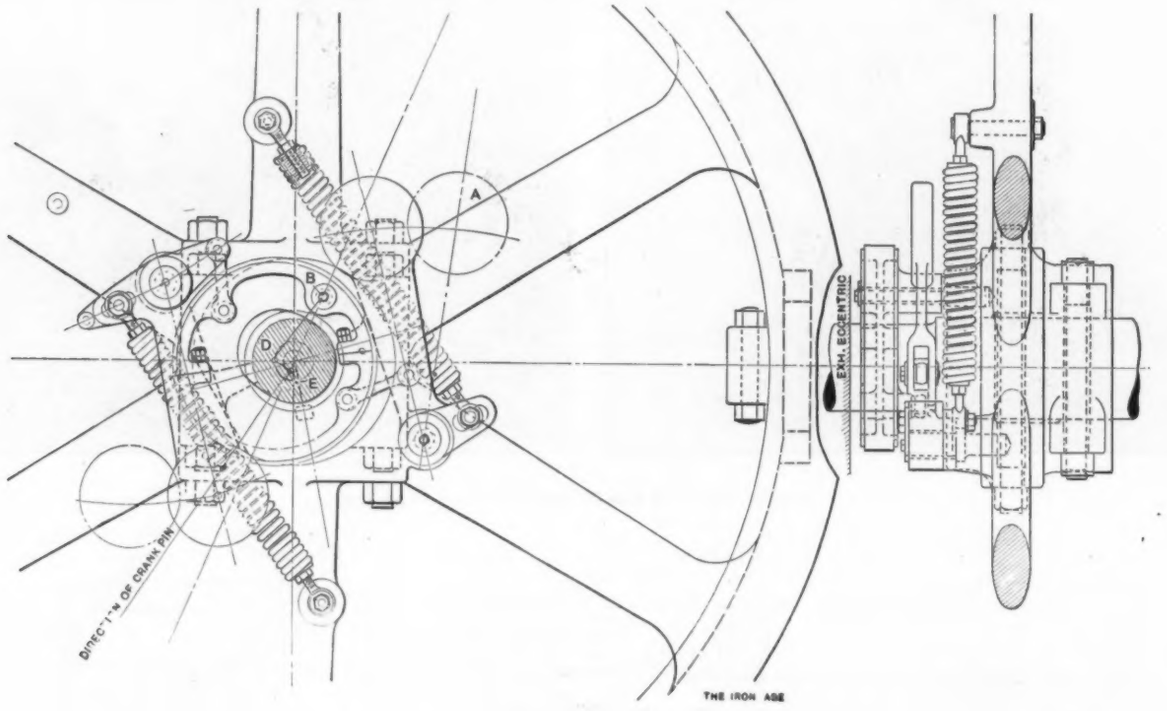


Fig. 4.—Details of the Mechanism of the Governor.

Many Ships Building.

There are now orders in hand for 31 large steel ships for the lake trade, to come out next spring and early summer. Some that were ordered for next spring delivery have been rushed out and have made a trip or two this fall. The American Shipbuilding Company

has orders for 26 ships of all classes, of which all but one are ore and grain carriers, though designed particularly for ore. The Great Lakes Engineering Works has four 10-000-ton ships on hand and the Toledo yard has one large ship. These 31 vessels will be able to carry about 270,000 gross tons per trip, or 5,400,000 tons during the usual season of navigation, and they will cost $10,500,000.

Independent lake ore shippers will not make any more trips this fall, but the United States Steel Corporation expects to keep its ships in commission as long as ore can be handled away from mines and docks, and may be shipping from some ports for two and three weeks yet. The ore roads have all ceased to haul ore unless ships are ready at the docks or within a few hours of them. Ore is not kept in docks or cars on account of the danger of freezing in a solid mass before it can be removed. The corporation seems especially hungry for ore and its orders are for the last pound that can be shipped. This cannot be by reason of any shortage in receipts at lower lakes, for they have been enormous and the stocks at the eastern end of the lakes and at furnaces are immense, hence there is some speculation at this end as to the reason for this pressing and continued demand. It is doubtless determined to be fortified for whatever may occur next season in the way of delays or labor difficulties. The way in which the mining end of the corporation and other large interests on Lake Superior have kept out of labor troubles and consequent delays this year has been remarkable, and all seem to have been especially fortunate. D. E. W.

Recent Customs Decisions.

Galvanized Iron Tubes.

In a decision by I. F. Fischer the Board of United States General Appraisers has decided that the collector of customs at Galveston, Texas, is in error in assessing an additional duty of 2-10 cent per pound on galvanized iron tubes. The collector is therefore directed by the board to make a reliquidation based on the lower rate of duty. It appears that duty was assessed on the tubing at the rate of 35 per cent. in addition to the duty mentioned above. The tubes had brass connections and these were assessed at 45 per cent. Although the importers were notified of the time and place of hearing they refused to appear, nor was any testimony in support of their allegation submitted. At the same time the board finds that the additional duty can properly be levied only on sheets or plates and on hoop, band or scroll iron or steel, but not on tubes. The collector is instructed to make a refund of the excess duties demanded and paid by the importers to the Government.

Pyroxylin Manufactures.

The Board of Appraisers has sustained a claim made by Jordan, Marsh & Co., Boston, regarding the customs classification of spoons, forks and ladles upon which the collector assessed duty at 65 cents per pound and 25 per cent. as articles made of pyroxylin. It was maintained by the protestants that the articles were dutiable under the provision in the tariff act for manufactures of metals with duty at the rate of 45 per cent. The Customs Court finds that the importers' claims are well founded as regards the spoons and ladles. It is held, however, that an incorrect claim is made regarding the forks, as they are specially provided for under paragraph 155 and do not come within the meaning of the provision for manufactures of metal.

Cast Iron Retorts.

The General Board has denied a claim filed by F. Behrend, New York, and held that iron retorts must stand duty at the rate of 45 per cent. The importer took the view that the goods were castings and as such dutiable at the lower rate provided for such articles. The board finds that there was no error on the part of the collector and his action is consequently affirmed and the importer's petition denied.

Round Wire.

The board has sustained a claim by Hermann Boker & Co., New York, it being held that round wire for dental instruments is dutiable at 40 per cent. and not at 45 per cent., as assessed by the collector. The Treasury Department will make a refund of the excess duties collected by the Custom House authorities.

Wolfram Metal.

F. B. Vandegrift & Co., New York, were defeated in an attempt to secure lower duty on merchandise invoiced as wolfram metal. It was returned by the appraiser as containing 93.52 per cent. of tungsten and was assessed as metal unwrought at the rate of 20 per cent. It was claimed to be free of duty under paragraph 614 or else dutiable at 10 per cent. as an unenumerated unmanufactured article. The importers failed to offer any evidence and the board therefore overruled the protest.

Brass Stampings.

Acting on the authority of a previous decision on similar merchandise, the Board of Appraisers has reversed the Collector at New York and held that brass stampings designed exclusively for use as parts of millinery ornaments are dutiable at 45 per cent. The assessment made by the collector at the rate of 60 per cent. is deemed incorrect.

Lead Ore.

The New York & Honduras Rosario Mining Company won a victory before the Board of General Appraisers last week when it was decided that the percentages of lead in certain importations of ore as returned by the company were correct and should form the basis for assessment by the Treasury officials. Tests made in the New York Custom House by the Government chemist and a commercial chemist employed by the importers demonstrated that the percentage returned by the company was correct.

Metal Fencing.

The Board of Appraisers has decided adversely to the importers the claim of the London Fence Machine Company, Cleveland, regarding the rate of duty applicable to merchandise described as metal fencing and claimed to be castings. The articles appeared to be gas tubing bent into shape, all of the merchandise being assessed at 45 per cent. Part of the goods was claimed to be dutiable at 8-10 cent per pound and the remainder either at 4-10 or 5-10 cent per pound. As the importer failed to submit any evidence in support of its allegation the board holds that no relief can be granted.

Safety Pins.

It has been decided by the lower customs tribunal that George Borgfeldt & Co., New York, will have to pay duty at the rate of 45 per cent. on nickel plated safety pins. The importers set up the claim that the merchandise should be considered "safety pins" and as such dutiable at only 35 per cent. The pins were carefully analyzed at the United States Laboratory and were found to be nickel plated. It is therefore held that the articles must pay the higher rate of duty.

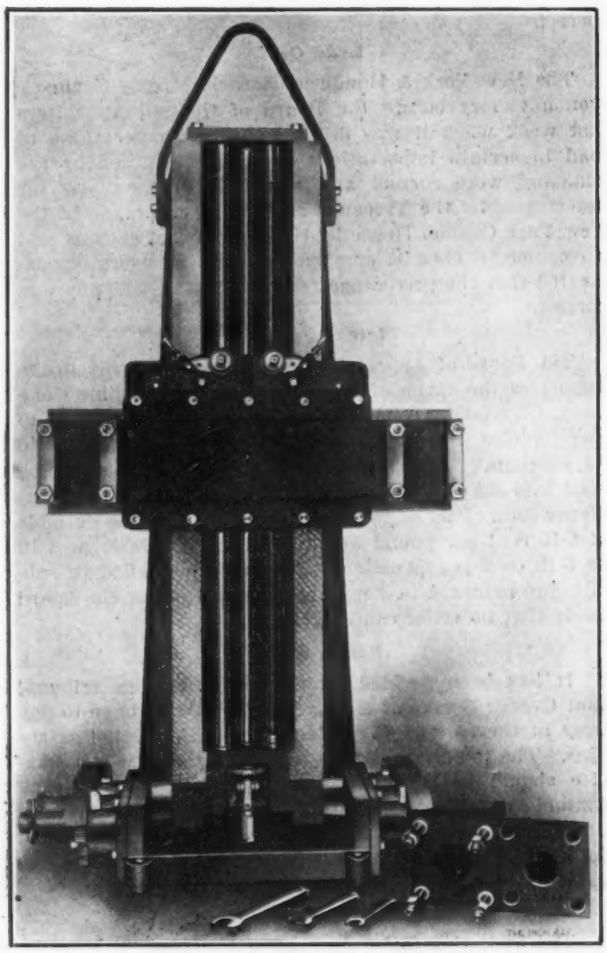
The Warwick Wire Annealing Furnace.—In the description of this furnace printed in the issue of October 26 a typographical error was made in the dimensions of the furnace. The part that read "The furnace is a long structure, having a number of firing chambers, usually four, as in the furnace illustrated, which is 145 feet long by 9 feet 3 inches wide by 10 feet 10 inches high," should have given the length dimensions as 45 feet instead of 145 feet. The correct dimension was given on the illustration showing the side elevation of the furnace.

The Hamilton Pit Car Loading Machine.—In the issue of November 9 there was printed an abstract of a paper read by William E. Hamilton before the Engineers' Club of Columbus, Ohio, which described a pit car loading machine. The paper failed to state that the machine is built by the Hamilton Mfg. Company, Columbus, Ohio, of which the author is president.

The Espen-Lucas Portable Tool Post.

The illustration shows an attachment for very large boring mills or planers that can best be described as a portable tool post. It was designed and built by the Espen-Lucas Machine Works, Philadelphia, Pa., for use on a special boring and turning mill constructed by the Crocker Wheeler Company and installed in its works at Ampere, N. J. The machine has a revolving table, is about 24 feet in diameter and at its center there is a stationary part 5½ feet in diameter. The tool post can be secured to the revolving platen of the boring mill and be used for turning the inside of large work clamped on the stationary bed plate of the mill, or it can be placed on the stationary bed plate of the mill and used to turn up the outside of work clamped on the revolving table of the machine.

In all its parts this tool post is extremely strong, as it is designed for very heavy work, steel castings being used throughout to give it the required stiffness for a tool of its character. The head has a vertical movement of 72 inches, with a horizontal traverse of 32 inches. It has power feeds in all directions. Levers shown on the



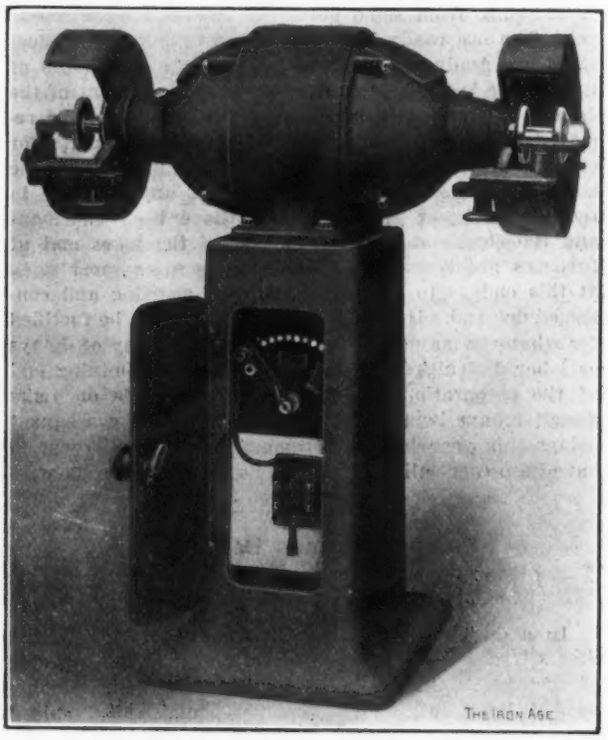
A Portable Tool Post for Use on Large Boring Mills or Planers.

head of the tool control the lateral movement of the head, while a clutch at the base may be engaged to raise and lower the head or disengaged to maintain it in a stationary position. The feed to the head is obtained through star wheels at the base of the machine and may be made variable by using different stars, or if desired an electric motor may be used to drive the feeding mechanism. The stars are turned by fingers bolted to the plate when the post is on the platen or *vice versa*. The gears are all made of steel forgings and the driving shafts are fitted at the base with roller bearings. An extension to the head is supplied to increase the reach of the tool holder for special work.

The machine illustrated was designed particularly for turning armature segments, frames, &c., but the range of its applicability in all lines of heavy machine work is almost unlimited.

A New Ransom Motor Driven Grinder.

A 2 x 12 inch motor driven grinder has been added to the line of grinders built by the Ransom Mfg. Company, Oshkosh, Wis. For several years this company has been manufacturing sizes 2 x 18 inches, 3 x 24 inches and 4 x 30 inches. This new size extends the range to cover work



The Ransom 12 x 2 Inch Double Dry Grinder.

of smaller character. The emery wheels of the double and dry grinder, illustrated herewith, are mounted upon an extended armature shaft of large diameter made of high carbon steel, turned and ground. The journals are ring oiling and run in phosphor bronze dust proof boxes. The emery wheel spindles are 1½ inches in diameter. The machine is mounted on a very heavy pedestal base, with ample floor bearing to insure steadiness. The starting box, switch and nonarcing fuses are mounted inside the pedestal. The machine operates at 1700 revolutions per minute, is capable of carrying two 2 x 12 inch emery wheels and can be furnished for direct current of any voltage.

The collapsing of boiler furnaces is almost always the direct result of scale or of oil in the feed water, the latter being a particularly prolific source of trouble, according to a recent paper before the Northeast Coast Institution of Engineers. No ordinary furnace fails for lack of strength if clean and covered with clean water. A very thin smear of oil, however, has an effect totally out of proportion to what might be expected. In a furnace having a normal factor of safety of five, this factor rapidly decreases after the temperature reaches 650 degrees F., and entirely vanishes at a red heat. Steam at a pressure of 200 pounds has a temperature of about 380 degrees, or 270 below the point at which the tenacity of the steel begins to be affected, but a clean furnace, rubbed over with a very clean and thin coat of mineral oil, will soon rise above 650 degrees, even under light duty, and often reach 1200 degrees, at which point 75 per cent. of the strength has departed. With the use of hight grade mineral oils the danger is less than with low grade oils, due to the fact that the latter emulsify and hence cannot be removed from the feed water except by chemical treatment.

A New Toledo Toggle Drawing Press.

An interesting mechanical movement is embodied in the new toggle drawing press, known as No. 167, built by the Toledo Machine & Tool Company, Toledo, Ohio. Fig. 1 shows a general view of the machine and Fig. 2 a line elevation that shows the movement and indicates the manner of its operation.

The working parts of the press are a plunger and an outside slide, through which the plunger works. The plunger is reciprocated directly from the main crank shaft which carries the fly wheel, and the slide indirectly is driven from the same shaft. The crank at the center of the shaft connects through a pitman and heavy adjusting screw with the top of the plunger, and a crank at the outer end of the shaft actuates the toggle slide through the medium of a series of links and levers. A pendulum link from this crank is attached to the upper end of a yoke or clevis, which at the same point is pivoted to a lever fulcrumed on the frame, while the lower end of the clevice is pivoted to another and longer lever, also fulcrumed on the frame, but nearer the front. Vertical links attached to the clevis somewhat below its middle point connect it to the short arms of two bell crank levers pivoted on the frame. The long arms of the bell cranks are connected by links with rocker arms on the front and rear toggle actuating shafts, which operate the blank holder or outer slide. By the vertical movement imparted to the yoke clevis a practically perfect dwell is obtained during the entire working time of the forming punch or plunger, and with the system of connections as a whole the required power is delivered with a minimum amount of friction, which minimizes the driving power necessary to operate the press.

The front and rear rocker arms at the top of press frame operating the inner toggle movement are made of steel. A heavy substantial frame connects the toggle movement and outer slide or blank holder. This blank holder is given a wide range of adjustment by means of the heavy studs or screws at each of the four corners of outer slide. The crank is connected to the inner plunger or forming punch, moving inside of the outer slide or blank holder by a connection and screw. This

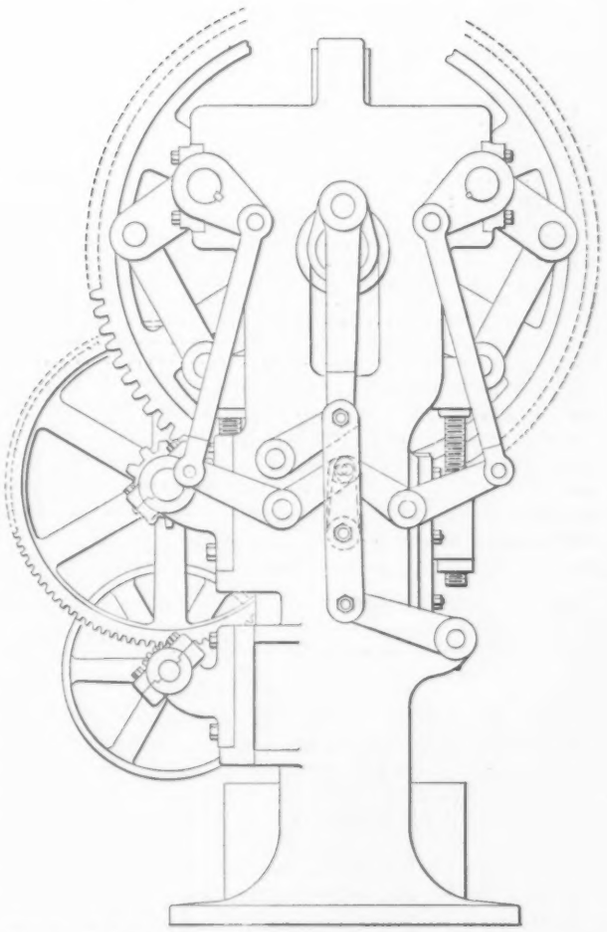


Fig. 2.—End Elevation of the New Toledo Toggle Drawing Press.

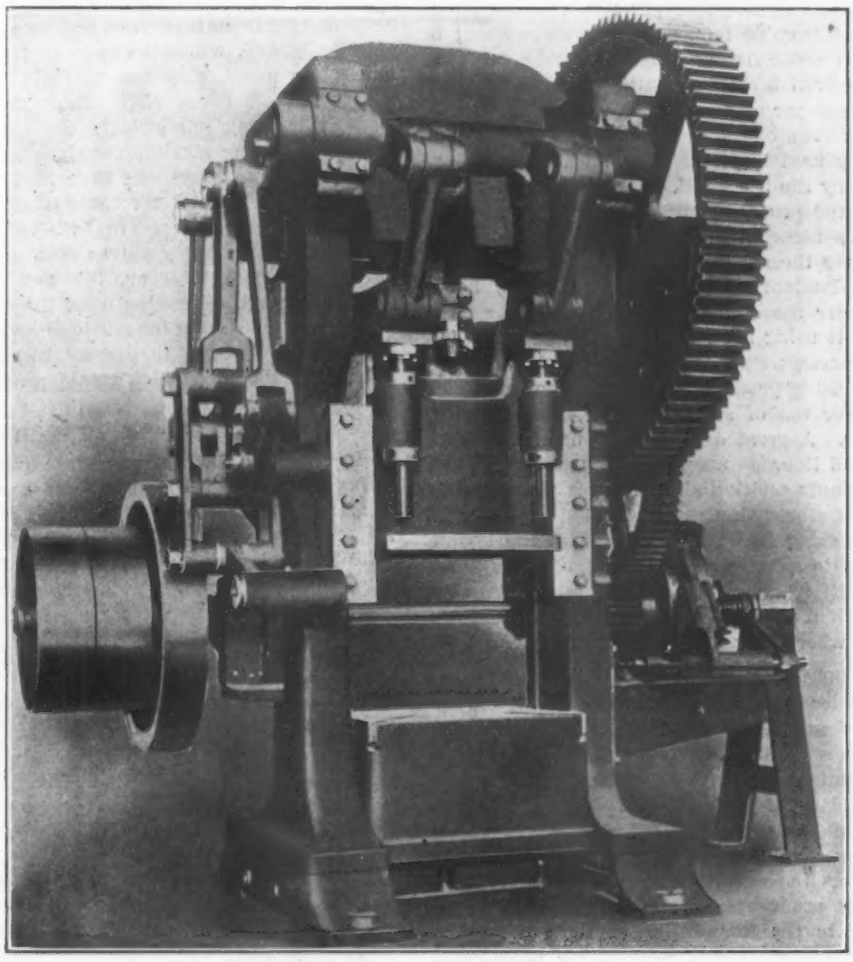


Fig. 1.—The No. 167 Toggle Drawing Press Built by the Toledo Machine & Tool Company, Toledo, Ohio.

connection has a cap held in position by four studs bearing perfectly on the threaded portion of screw, and in this way securely clamping the screw and positively preventing it from working loose. The screw is adjusted by a gear and pinion from the front of the press, where it is easily accessible for a quick adjustment.

The following are some of the principal dimensions of the press:

	Inches.
Width between uprights	35
Distance bed to blank holder, stroke down and adjustment up	16
Distance bed to plunger, stroke down and adjustment up	18
Stroke of blank holder	12
Stroke of plunger	17
Adjustment of blank holder	8
Adjustment of plunger	8

The press is capable of drawing metal of 16 gauge in plates not exceeding 24 inches in diameter. The one illustrated weighs 44,000 pounds and is one of ten sizes recently placed on the market by the Toledo Machine & Tool Company, ranging in weight from 5000 to 150,000 pounds and adapted for drawing sheets of tin, brass, copper, aluminum, steel and other metals.

Open Hearth Furnace Comparisons.—II.*

BY A. D. WILLIAMS, JR.

Consumption of Fuel.

In the Pittsburgh district and elsewhere where natural gas is available a number of open hearth furnaces are operated with this fuel, but owing to distrust in regard to the permanency of the supply at profitable prices for this use the furnaces are designed so that they can be altered to use producer gas with slight changes in the flues. In the Carnegie No. 3 open hearth plant the gas is brought to each of the 50-ton furnaces by a 6-inch supply pipe which branches to both ends of the hearth and there divides into two 4-inch pipes, which pass down on each side of the ports to the burners. The burners are located close to the bottom of the ports about 3½ feet back from the hearth. The average fuel consumption using natural gas, including gas used for heating the ladles, is about 10,000 cubic feet per ton, ranging from about 7000 to 13,000 cubic feet. The gas costs about 5 to 8 cents per 1000 cubic feet and has a calorific value of from 900 to 1000 British thermal units per cubic foot, or 8000 to 8900 calories per cubic meter.

A few furnaces are operated with coke oven gas, but the fuel generally used is producer gas, which in a few cases is enriched by the use of oil. Abroad a great many furnaces use oil and producer gas. The use of oil is advantageous where the coal is low in volatile hydrocarbons; in such cases the use of oil changes the blue flame of the gas to a luminous flame of great radiant heat. The writer is under the impression that one of the German steel works is using blast furnace gas and oil in its open hearth furnaces with success. The fuel consumption of furnaces using producer gas ranges up from 450 pounds of coal per ton of steel, in some cases running over 1000 pounds. A great deal depends upon the quality of the coal and likewise upon the arrangement of the plant; in fact, plants melting similar stock and making the same grade of steel using the same kind of coal will attain widely differing fuel results, owing to the layout of the plant and the personal equation of the operators. Long flues are undesirable, as the gas has an opportunity to cool and deposit a portion of the volatile combustibles in the gas main, where they are a total loss.

Large Gas Mains Desirable.

The gas flue leading from the producers should be for a minimum of sufficient size to permit of a man passing through them, and suitable manholes should be placed at convenient points. Underground flues should have a wall a brick and a half thick, of red brick, laid in cement outside of the fire brick lining, and the lining of steel gas mains should be at least 6 inches thick. A large gas main has the advantage of permitting the gas from the different producers to mix and in this way insures uniformity in the composition of the gas supply. It also acts as a reservoir or gas holder in smoothing off the peaks in the demand for gas by the furnaces to suit the production curve of the producers. In determining the size of the gas main it can be based upon the grate of the producer, 1 square foot being allowed in the main for 8 square feet of grate area. Smaller mains are often used, but are not advantageous and larger mains are desirable.

Valve Troubles.

The reversing valve is the weak point in most furnaces, as the valve losses are a great deal higher than usually considered, often running as high as 10 to 20 per cent. of the total fuel consumption. A great many attempts have been made, with more or less success, to design valves which will prevent or at least reduce the losses by leakage and during reversal. Water seal valves are tight as long as the seal holds, but as the depth of the seal is limited any excess in gas pressure or in the intensity of the draft will break the seal and a great deal of gas will be lost before the pressure drops sufficiently to permit the seal to re-establish itself. In large sizes these valves are so difficult to handle that mechanical power with its added complications and opportunities for trouble is required to throw the valve.

All of the valves in common use burn out rapidly. This is particularly the case with the ordinary Siemens or butterfly valve. In water seal valves the hoods warp badly, often to such an extent that they do not seat properly. Brick lined hoods have been tried to avoid this trouble and are but partially successful, as additional weight makes the valve harder to throw and adds considerably to the expense of upkeep.

Mushroom valves, both plain and water cooled, are used but plain mushroom valves burn out rapidly, the stems often giving out first and causing a very nasty fishing job to get the red hot valve disk out of the flue so that a new valve can be put in. Water cooled valves are more durable but they crack if the water is cut off and cause trouble. In winter it is almost impossible to prevent the water pipes around an open hearth plant from freezing, particularly during the Sunday shutdowns, &c., when it will not be discovered for some time. There is more danger from this when sudden cold snaps occur unexpectedly and, while the damage to the valve may not amount to much, sufficient cold air may be drawn into the furnace to cause considerable damage to the brick work, this being particularly the case with water seal valves. In using mushroom valves for reversing, a large amount of brick work and excavating is necessary, four valves being required for the gas and four for the air. They must be so arranged that the valves to the stack flue close before the supply valves open, and while it is comparatively simple to secure this result, more or less rigging is required depending upon the relative locations of the valves. The seats for mushroom valves should be beveled sharply enough to prevent any small obstructions lodging on the seat which would prevent it from closing tightly.

Producer Grate Area.

In regard to the producer grate area required, the gasifying capacity of the producers must be sufficient to supply the maximum demand, and there must be some reserve to permit of cleaning, &c. The following table gives the gasifying capacity of some of the leading makes of producers, and while with expert gasmakers and good coal it is possible to get these results, the output under usual working conditions runs from 20 to 40 per cent. less, a part of this deficit being due to the coal and the balance to the labor employed.

Producer.	Grate area. Square foot.	Pounds per hour.	Pounds per square foot of grate per hour.
Duff, 12-foot	63	1,400	22.3
Duff, 10-foot	49	1,120	23.0
Swindel, 12-foot	..	1,500	...
Talbot, 10-foot	46	750	16.3
Forter, 10-foot	50	750	15.0
Morgan, 10-foot	78	...	*7.5 to 11.0
	49	625	†12.7
	..	800	‡16.3

* Test at Illinois Steel Company.
† Usual conditions. ‡ Forced.

* The first article on this subject was printed in *The Iron Age* of September 21, page 740.

The last three results were actual operating conditions in mill practice and are probably as good as will be obtained in such cases. The first five items give the gasifying capacity named by the makers and it is probable that these figures could be exceeded by operating the producers to the best advantage, but such conditions are rarely obtained in practice.

A rule of thumb is "3.5 square feet of producer grate per ton of furnace capacity." The following table gives the ratio of grate surface used in furnaces of varying capacity:

Furnace.	Producer.	Producer grate area. Square feet. Total.	Per ton.
10-ton Rechitza	Siemens	28.4	$2.84
15-ton Wellman-Seaver	2 Talbot, 10-foot	92.0	6.15
20-ton Alliance, Ohio		100.0	5.00
35-ton Pittsburgh		...	4.80
40-ton Grand Crossing	3 Morgan, 10-foot	234.0	5.85
50-ton Ill. Steel Co.	4 Morgan, 10-foot	312.0	6.24
50-ton Lukens	4 Talbot, 10-foot	184.0	3.68
50-ton Ohio	4 Duff	252.0	5.04

Flue Areas.

Following is a table of air and gas valves and stack dimensions:

Furnace.	Valves. Air.	Valves. Gas.	Stack. Diam. Ft.	Stack. Diam. In.	Stack. Hight. Ft.
15-ton	27-in. Butterfly	24-in. Butterfly	4		90
20-ton Alliance, Ohio	27-in. Forter	27-in. Forter			100
25-ton Wellman-Seaver	36-in. Forter	32-in. Forter	5		125
35-ton Illinois Steel Co.	33-in. Mushroom	33-in. Mushroom			...
35-ton Bridgeport, Conn.	33-in. Forter	30-in. Forter	4	8	114
40-ton Homestead			5		140
50-ton Duquesne			5	6	150
50-ton Illinois Steel Co.			6		160
50-ton Wellman-Seaver	48-in. Butterfly	42-in. Mushroom	6		150

The area of the flue leading from the reversing valves to the stack should be about 25 per cent. greater than the area of the stack, but no flue should be so small that a man cannot get through it. In the above it will be noted that the area of the gas valve is about 80 per cent. of that of the air valve, and the combined area of the air and gas valves is from 60 to 70 per cent. of the stack area.

Following is a table of air and gas port areas:

Furnace.	Air port. Square feet.	Gas port. Square feet.
50-ton Laughlin	18.4	6.85
50-ton Unknown	14.5	8.10
40-ton Homestead	14.25	8.0
50-ton Homestead	18.0	8.0
50-ton Duquesne	18.0	10.5
20-ton Alliance, Ohio	12.5	2.81

In the Alliance furnace there are three air uptakes having a total area of 4.23 square feet, and two gas uptakes having a total area of 2.81 square feet. In this and the first two of the above furnaces the air port is very nearly the width of the hearth, and about 125 feet in hight. In the 50-ton Homestead and Duquesne furnaces the uptakes are of the same area as given for the ports—that is, in these furnaces there is practically only one port into which the air and gas uptakes debouch. These furnaces are fired with natural gas, but are so designed that they can be altered to use producer gas.

Arrangements of Ports.

The ports of an open hearth furnace should be so arranged that the gas is spread out over the width of the hearth beneath the air, and the gas and air should be brought together just before they enter the heating chamber. As most furnaces are arranged there is a dead place at the end of the hearth at which the gas and air are entering the heating chamber, and the hottest part of the flame is close to the exit ports, extending down into the checkers in many cases, where combustion is undesirable.

In modern furnaces the air and gas leave the regenerators by an opening in the end wall of the regenerator chamber, passing into the cinder pockets, from which the uptakes lead to the ports. False arches are so arranged that the cinder pockets can be cleaned with a minimum amount of trouble. In many cases false arches are placed in the back of or to the sides of the uptakes, and in some cases in the walls surrounding the regenerator chambers.

Casting Methods.

The most common arrangement of an open hearth plant places the furnaces in a single line, having on one side the charging floor, covering the regenerators and in some cases the reversing valves, then the stock yard and the producer house; on the opposite side of the furnaces are the casting house and mold yard. In small plants and where bottom cast ingots are turned out casting pits are employed, and this method is also used where large ingots of special sizes must be made, as for armor plate and large forgings. Plants having a large output generally make top cast ingots, casting on cars, this method being more rapid than casting in a pit. A few open hearth plants, notably the Homestead No. 3, are arranged with a double line of furnaces with the casting house between them. This arrangement has serious disadvantages, and it is not likely that the arrangement will be copied.

In a few plants one of the furnaces has been arranged with a removable roof so that salamanders too large to be charged in the usual manner can be charged in the furnace and melted up. An arrangement of this kind is convenient, as it enables the plant to dispose of accidental run outs and other scrap of this character in such a manner that they are not a total loss.

That the size of war ships is rapidly increasing is common knowledge, but the extent of the average increase is by no means so well known. The number of war ships of 12,000 tons displacement or over built and building for the several naval powers July 1, 1899, was 77, of which 46, or 60 per cent., belonged to the English navy. In 1900 the number was 94 (British 48, or 51 per cent.); in 1902 there were 101 (British 53, or 48 per cent.); in 1903, 139 (British 64, or 46 per cent.); in 1904, 155 (British 70, or 45 per cent.); in 1905, 153 (British still 70, or 47 per cent.). It will be noted that the falling off this year was due to the loss of a number of Russian ships. The number owned by the United States increased from nine in 1899 to 14 in 1902, 23 in 1903, 26 in 1904 and 28 in 1905. In the last year France is credited with 15, Italy with 11, Germany and Japan with 10 each and Russia with 9. In this connection it might be remarked that the average displacement of all war ships, excluding torpedo craft, has increased successively from 3883 tons in 1899 to 4131 in 1900, 4416 in 1902, 4725 in 1903, 5010 in 1904 and 5739 in 1905. This shows an increase of 48 per cent. in six years, which is accounted for partly by an increased size of war ships built and partly by the "scrapping" of old style ships, usually of small size. By this latter process England has brought her average displacement in the last year from 6293 tons to 9073 tons.

The Correspondence School of Automobile Engineering, formerly of Akron, Ohio, is now located in the Flatiron Building, New York City. This move is intended to give the school better facilities for the proper instruction of its students and revision of its lesson papers. Incidental to its change of address the school has been reorganized on a more substantial basis and now is incorporated under the laws of the State of New York, with a capital of $30,000. R. E. Olds has succeeded A. J. Saalfield as president, R. M. Owen has become treasurer in place of E. R. Adam and Robert H. Montgomery is secretary instead of G. S. Rowe. Victor Lougheed will continue as vice-president and general manager.

Manufacturers of the Blackstone Valley, New England, chiefly Rhode Island companies, are contemplating the establishment of large storage reservoirs on headwaters of the Blackstone River and its tributary streams, the purpose being to furnish additional power during all seasons and especially a reserve supply of water during times of drought. Two reservoirs are said to be practically decided upon, but three others are under consideration, the total horse-power of the five amounting to 3860.

The Coal Situation as Regards Labor.

BY FREDERICK E. SAWARD.

The possibility of a general coal miners' strike April 1, when the awards and agreements terminate in both the anthracite and bituminous fields, makes information having a bearing on that subject of importance to all consumers of fuel. In this article it is purposed to give the facts as they exist, and some forceful figures as to employees, &c.

The Agreements.

There is a joint agreement between the miners and their employers in the bituminous districts of the United States, covering what is known as the interstate or competitive district, which comprises the western district of Pennsylvania, Ohio, Illinois and Indiana, and this agreement, which was made in April, 1904, for two years, expires by limitation in April, 1906. The anthracite miners received a new basis rate of wages in April, 1903, under the award of the Roosevelt Commission, and that understanding also expires in April, 1906. Thus, so far as what is known as union labor in the mines (or where the United Mine Workers of America are strong) is concerned, the wage agreement with anthracite and bituminous miners expires at the same time, and, of course, there must be some arrangement or agreement made before that date or idleness will be the result. A convention of anthracite miners' delegates is to be held December 14 of the current year to formulate their demands for another year, while the interstate district miners will meet in February to formulate their demands.

The Coal Supply.

No great supply is in hand of any kind of coal, although there is an effort constantly being made to secure tonnage. Very little bituminous coal is carried in stock at any time, and it is doubted very much if there is a month's supply in the hands of the producing companies or in the yards and storage places of their customers, although certain railroad companies are, for obvious reasons, better fortified against short supply. Of anthracite coal probably something more than this might be on hand, if one takes into consideration the stocks carried by the retail dealers and by the householders or consumers of coal, as, forewarned by the troublous times of 1902, there is a natural disposition to carry something in the way of supplies.

Wages of Miners.

The American coal miner, as was shown by the testimony and conclusions of the Anthracite Strike Commission, is fairly well paid; the report itself states most positively that for labor performed of equal risk the miners have nothing left to demand. Take, as an instance, the figures paid in the competitive district above referred to; 52 cents per ton for run of mine coal is the figure, and this is a large advance over a few years ago, while inside laborers get $2.23, $2.36 and $2.42 per day of eight hours, according to special service rendered. In central Pennsylvania the rate per ton for mining is even higher, being 62 cents. In many other districts, where the union is not so strong, the rate is perhaps 45 to 50 cents per net ton.

The union leaders claim a membership for their organization of about 300,000 men out of a total of 500,000. While there are many foreigners, such as Poles and Hungarians, employed in and about the mines, as a a rule they are all good unionists (which is very much to their credit) and they do not work for a longer period than in other countries—in fact, much less, as the eight-hour day prevails in the bituminous regions. It is a fact that since the union has gained strength in the coal industry wages have increased very materially, and there have been claims and demands in almost every year during the past decade, either for higher wages or for fewer hours of work. In the Pittsburgh district it has been stated by leaders that earnings are 100 per cent. better than eight years ago and hours of labor are 20 per cent. less. In the anthracite region the miner does not work an average of five hours per day, but the outside laborer and the man who follows the miner to load the coal which he digs formerly worked ten hours. By the decision of the Anthracite Strike Commission, however, the basis for all this labor was cut to nine hours; now the effort is to secure a universal eight-hour day for all classes of labor. This now prevails in the bituminous districts, where the union is powerful.

Bituminous coal mining is a vast industry, the output amounting to 273,000,000 net tons for last year's record. It may be stated that this large production would not have been possible but for the use of mining machines, for 79,000,000 tons of this output were cut by machines during the year 1904. No machines are used in the anthracite mines for undercutting.

Character of Labor.

In the anthracite regions of Pennsylvania the unskilled immigrant, if employed at all, is employed at outside work or as laborer to the miner; but after service in the mines as a helper for a couple of years he can apply for and obtain a certificate as a miner. In the bituminous regions one finds that the immigrants are not unskilled who apply for positions for work in the mines. These men, even those who undergo a period of probation, have not been content with moderate wages; they are only too anxious to become members of the union, for good and sufficient reasons, and they have never had less than union rates of compensation, no matter what their nationality may be.

The anthracite question of labor supply and demand is of more particular interest from its narrow limits of ownership. The total number of employees, men and boys, is put at 161,330, and they mined, prepared and shipped to market last year 60,000,000 gross tons of fuel. Of these employees 110,362 were at work underground in various capacities. The actual certificated miners numbered 39,848 and their laborers 31,217. On the outside, in the preparation and the shipping, a total of 50,968 persons found employment, of whom 12,128 are put down as boys working in the breakers.

That accidents do occur is only too well known and 595 deaths are noted for the year 1904, with 1049 nonfatal accidents. By far the larger number of dead and wounded are to be charged against the inside workers' account, where falls of roof caused 238 deaths and 329 nonfatalities. The mine inspectors constantly refer to the fact that the bulk of these deaths and wounds is due to the carelessness of the employees themselves.

The mixed character of the employees is shown in the list of nationalities of the persons meeting with fatal accidents—namely, American, English, Welsh, Scotch, Irish, German, Polish, Hungarian, Italian, Slavonian, Lithuanian, Austrian, Russian, Greek, Swedish.

A New Bullard Boring Mill.—In the article in last week's issue having the foregoing title there was a typographical error. The third sentence in the first paragraph should have read, "Another feature original with the Bullard Company is called the 'automobile principle of control,' which provides for the centralization of all operating levers at the right hand side of the machine."

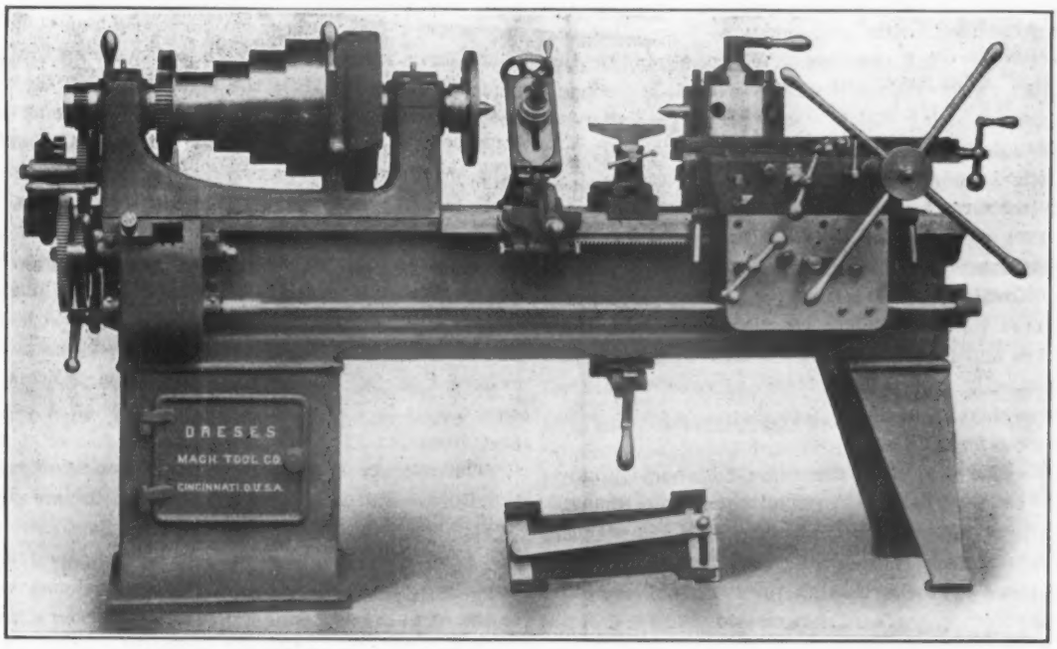
The central portion of the revolving field element of the 5000-kw. engine driven alternators of the New York Subway is a steel casting stated to weigh 20 tons. The bore has a mean diameter of 37 inches, there being a "stepped" fit on the shaft. Each of the four steps is 8 inches long, while a cored out section in the center 10 inches long makes the total length of the hub bearing 42 inches. The diameter allowance for the pressure fit was about 0.0067 inch, at which figure an end pressure of 550 tons was required to force the steel hubs into position on the shaft. The shafts are hollow nickel steel forgings, each having an axial hole 16 inches in diameter running the full length.

During the month of November the Bessemer department of the Newburgh works of the American Steel & Wire Company made 64,600 gross tons of steel ingots, and the blooming mills rolled 67,470 tons of 4 x 4 inch billets. Both of these records are in excess of any previous ones for the plant.

The Dreses New Universal Monitor Lathe.

A machine designed for general brass turning and similar work of special and heavy character, which requires no special tools and is capable of more economical operation than an ordinary universal monitor lathe, is shown in the accompanying half-tone. It is known as a 20-inch full universal monitor lathe and is built by the Dreses Machine Tool Company, Cincinnati, Ohio.

The turret carriage is provided with an automatic feed, placed, as in a regular turning lathe, in an apron at the front of the machine. By means of a circumferential pitch rack the feed range is exactly divisible. The four coarsest leads are 8, 11½, 14 and 18 per inch, conforming with the standard pipe threads. This arrangement not only avoids stripping of threads in large tapping, but also makes it possible to cut inside and outside straight and taper threads by a turret tool without a tap or die. There are 12 changes of feeds in all, the other eight being multiples by three and six, respectively, of the four coarsest. Four changes of feed can be made instantly by a handle located below the head stock and the reverse is made by a knob in front of the apron.



The New 20-Inch Full Universal Monitor Lathe Built by the Dreses Machine Tool Company, Cincinnati, Ohio.

Between the lower and upper parts of the turret carriage is a double dovetailed plate, to the lower side of which is swiveled a shoe sliding on the bar of the taper attachment shown below the bed. The frame of this taper attachment slides between the V's of the bed and the bolt clamping the guiding bar also holds the attachment in any position longitudinally. The whole attachment can be removed instantly when it is not to be used. The upper part of the intermittent dovetail plate is connected by a screw ball crank to its adjacent part to provide a hand cross feed. Screw clamping stops are used for setting the turret holes exactly in line with the spindle.

The turret carrying slide is provided with a pilot wheel for rapid longitudinal movement and a screw for finer adjusting. The turret revolves on a stem adjustable for wear and the locking pin withdraws at the return movement of the top slide, making it semiautomatic. The machine has the familiar chasing bar. The follower holder is yielding for taper work. Right and left hand threads can be cut without changing the leader.

The head stock is friction backed geared and has a four-step cone pulley, giving specially large belt contact. The spindle has a 1 13-16 inch hole through it and a wire feed can be easily applied. The cabinet support under the head is provided with tool shelves, and the tail leg is attached in a hinged manner to form a three-point support. The machine weighs about 2900 pounds.

The safest and most secure situation for a wind mill to avoid danger of being blown over has been generally supposed to be a place sheltered by trees or barns. Such, however, is not the case. The safest place for such a tower is on a hill, where the wind can strike it equally from all directions. In such a location shifting winds are less pronounced than behind buildings or hills, and it is also found that there is less lifting force to the wind in the open than behind obstructions.

The average speed of war ships is rapidly increasing. Excluding torpedo craft, the war ships built and building for the several powers July 1, 1899, had a mean speed of 16.92 knots. This figure has become successively 17.24 in 1900, 17.49 in 1901, 17.89 in 1902, 18.17 in 1903, 18.39 in 1904 and 18.71 in 1905. This increase of nearly 2 knots is due largely to the construction of large numbers of large armored cruisers, most of which are capable of steaming 22 knots or over, while the building of smaller and slow ships has heavily decreased. The mean speeds of the war ships of the eight greatest naval powers in 1905 are: England, 19.82; Japan, 19.41; Italy, 18.79; Austria, 18.65; United States, 18.64; France, 18.56; Germany, 18.18, and Russia, 17.29 knots. The fastest navy is that possessed by Chili, which with only 11 ships, largely very swift cruisers, has a mean speed of 20.71 knots.

For transmitting 50,000-volt current from the power house at Taylor's Falls to the city of Minneapolis, Minn., a distance of 41 miles, a 60-foot right of way has been purchased. Most of the transmission line will be mounted on poles of Oregon cedar, but in some sections, where an unusually heavy strain may be met, steel towers will be substituted. The copper wire has a diameter of about ½ inch. The porcelain insulators each weigh 22 pounds. Power will be generated as three-phase current at a pressure of 2300 volts, and will be raised to line pressure in step up transformers. At the substation in Minneapolis the pressure will be reduced to 13,000 volts, at which the current will be distributed for use. The line at present under construction will have a capacity of 25,000 horse-power, which will be used exclusively in Minneapolis. It is the intention to ultimately duplicate the line and plant, the second installation being for the use of St. Paul.

THE IRON AGE

1855—1905.

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The Personal Equation and the Life of Ore Reserves.

In the manufacture of iron the personal equation is a strong element and one which may never be eliminated. The industry depends much more upon practical managers and superintendents, whose personal equation is large, than upon scientists who make a clear effort to eliminate the personal equation. Where a change in equipment or processes is ultimately effected, there has generally been a delay which would not have occurred had not the members of the class interested been largely affected with the same personal equation.

In the matter of what constitutes the suitable or available raw materials for the manufacture of pig iron individual estimate and judgment have been particularly assertive. Owners of blast furnaces, for instance, are well convinced that the preference of their managers for certain cokes and their professed inability to make good iron economically from other classes of coke contain a very large personal equation. Here there is a clear issue drawn between two classes.

With the case of iron ore there is a factor which may be broadly referred to as a personal equation, although it is in quite a different category. The iron industry is using certain classes of ore in different localities. Deprived of these ores, the manufacturers would scarcely discontinue their operations, but would rather devote their energies to finding other ores. That some ores are used and others are not is, in a sense, the personal equation of the industry as a whole. Certainly it must be regarded as such when statisticians endeavor to make estimates of the total quantity of iron ore in the world, drawing the line as to inclusion or exclusion of definite varieties of ore by reference to the question whether such ores or similar ores are smelted in a commercial way at present.

Attention is drawn to this subject by the fact that a report was recently submitted to the Swedish Government on the iron ore supplies of the world. The purpose was a most sensible one, being to present a comparison between the Swedish deposits as known and the deposits of the rest of the world as known. Such a comparison might be useful, for instance, in its bearing on the question whether it would be desirable to place an export duty upon Swedish ore. When any such presentation is made, however, there seems to be an irresistible tendency to forcast "how long the supply will last"; and when that is attempted careful attention must be paid to the personal equation of the industry, whereby it regards certain ores as possible and other ores as impossible. The iron masters of the world are not called upon in their individual capacities to look more than a certain distance ahead. In the erection of a new blast furnace, or in the purchase of a tract of ore land, their determination is reached by reference to certain considerations. On account of interest charges the present value of a piece of ore land, however valuable it may be at the time it is utilized, is less than that value by the amount of interest charges accruing until then. If the time of utilization is far distant the present value may be very small, and on account of the element of chance which must be considered the present value may be reduced to almost nothing. It may easily be reduced to less than nothing, in fact, on account of taxes. Such periods are in general much shorter than the prospective life of the now known and worked iron ore deposits. The personal equation of individuals, all tending pretty much in the same direction, together with the equation of the industry as a whole, draws a line between the possible and impossible ores in a different place from where it will be drawn a decade hence, a quarter century hence, or when the now known and worked deposits are exhausted.

When the statistician endeavors to draw conclusions from such presentations as the Swedish one just referred to he may make a feeble effort at allowances, but he does not make a clear allowance for the personal equations which have been discussed. Indeed, were such allowance made to its full value, the significance of the tangible figures presented would be so greatly reduced that they would be quite valueless for the purpose, although quite valuable for other purposes.

It is well remembered that the first ores brought down from the Lake Superior region met with extreme disfavor on the part of certain blast furnace managers when put in competition with Pennsylvania ores. The standard Bessemer pig iron of the United States would be in similar disfavor with British Bessemer works managers accustomed to and believing in their higher silicons. Ores now wholly in disfavor may within a short time become favorites.

The average iron content of all iron ore smelted in the United States has been decreasing in late years, or in fact ever since the swing from various local ores to the Lake Superior ores. There is, then, no reason for drawing the line of workability as to richness where it is drawn at present from commercial considerations when endeavoring to forecast the duration of our ore supplies.

It happens that the revolution accomplished by the Bessemer process did not operate in the direction of making available ores which were not previously available, but such an invention can easily be conceived. There are enormous deposits of titaniferous ores, now lightly regarded, which some great invention may make valuable. It has not been shown that a process cannot be devised to make normal pig iron from them. It certainly has not been shown, and in the light of the pranks played by alloy metals it would be foolish to attempt to show, that some ingredient may not be found for the molten steel either to eliminate or to make useful the titanium, just as the simple addition of ferromanganese forms so fundamental and necessary a part of the Bessemer steel process.

Passing from the influence of personal equations on estimates of the duration of iron ore supplies, it may be remarked that summaries of the world's available iron ore generally contain important omissions. The Swedish summary recently presented, for instance, treats Alabama in a way which our Southern friends can hardly enjoy. The State is represented as containing 60,000,000 tons of "Alabama brown hematite" and nothing else. The estimate of tonnage of this particular description of ore is large enough; indeed, it may be too large. But Alabama depends upon her red fossil ores and not on her brown ores. In the past few years the average consump-

tion of Alabama ores has been close to three-fourths red and but little over one-fourth brown. When it comes to comparisons of the extent of the deposits of the two descriptions there is no comparison at all. The proportion of easily mined red ore is many times that of the brown ore, and the tonnage extent of the red ore could be even roughly approximated only by drawing an arbitrary line and saying that beyond that line it would not pay to penetrate in order to bring out ore. With the crude mining practice long prevalent in the South that line must be drawn far away. Alabama has needed vastly more such improvement in mining methods as has been particularly noticeable in the operations of one prominent company in the past few years than to seek other deposits of iron ore.

Fewer Strikes by British Labor Unions.

Figures published in recent weeks by the Labor Department of the British Board of Trade indicate a lessening of strikes by labor unions. In some particulars the record is quite remarkable. It shows that disputes between unions and employers numbered only 334 in 1904, as compared with an average of more than twice that number for each of the preceding ten years. The number of workmen involved in such disputes was 83,922 in 1904, while it was more than twice that number in each of the preceding ten years. The aggregate number of days lost from such causes in 1904 was 1,416,265, while for each of the six years ending with 1898 an average of more than twelve million days were lost through strikes and other labor contests. There has been nothing in the present decade to compare in the number of men involved and in wage losses with the great coal strike of 1893 or the engineering strike of a few years later. The question is raised by the *Iron and Coal Trades Review* whether the diminution in strikes and in the losses attending them are really indicative of lessening aggressiveness and arbitrariness on the part of British trade unions. It may be, as that paper suggests, that British labor is becoming more wary and that labor leaders, instead of rushing into strikes on falling markets, are learning to bide their time and seek the help of prosperous times with rising prices. In the past eight years the percentage of victories for employers, computing the percentages by the number of employees involved, has been decidedly greater than that for the employees, except in the year 1900. It is scarcely to be doubted that the outcome of the engineers' or machinists' strike was a very decisive setback to the aggressiveness of unionism and a check to the progress of the closed shop "principle."

There have been evidences at times that the radical type of unionism redoubled its efforts in the United States on the defeat of the British engineers, and it was favored tremendously by the new prosperity that set in with 1898. Now, again, after the lessons of 1903 and 1904, there is on this side, as in England, evidence of a less aggressive policy on the part of some labor leaders—a policy compelled by the strengthening of public sentiment against union domination of industry. Strikes will come; indeed, in some trades there is still marked evidence of the control of the old type of leaders who prefer a fight to a peace of mutual concession. Yet with no statistics that go to prove it, as in the case of Great Britain, signs multitply of a decreasing desire on the part of the unions to rush precipitately into strikes. Of the part the employers' associations of the country have had in this consummation, as has been indicated in these columns in various reviews of that movement, there can be no doubt.

The Russian Collapse.

For some time the fact has been obvious that the disturbance in Russia has been the one obstacle to a world-wide improvement in the iron industry. Every other iron producing country has been enjoying a steadily increasing trade. The three great producers—the United States, Germany and the United Kingdom—have especially seen their trade grow and prices strengthen. The fierceness of competition for the trade of common markets has abated, and profits are no longer being sacrificed for the doubtful benefit of securing tonnage. As far as this country is concerned, the limit of output appears to have been reached with existing facilities. The iron and steel works of Germany are turning out a greater product than ever before and disposing of it more largely in the home market than for several years. In Great Britain the most striking proof of a substantial betterment in trade conditions is seen in the steady enhancement of prices despite the great accumulation of Cleveland pig iron due to the ill advised speculation in pig iron warrants. The situation, except for the position of Russia, would seem to be rapidly paralleling that of 1872, when the entire world became ravenously hungry for iron. Danger exists now, however, that Russian affairs may so project themselves into the financial relations of other countries as to check the activity of the iron trade. The fall in Russian bonds and the slump in Russian railroad and industrial securities are hitting severely German as well as French investors and financiers. Up to the past week the placidity of these holders of Russian paper has been a most remarkable exhibition of faith in its value despite the apparent helplessness of the Russian Government to tranquilize its distracted people. But at last the weakened dam of confidence has given way and the flood of suddenly awakened fear of greater loss is pouring Russian securities on European exchanges at a rate which may at any time run into a panic. While an actual panic may be averted by the concerted efforts of international banking interests, it is inconceivable that such a shock as this will not be without effect on the commercial and manufacturing interests of Europe. The weakening of credit and the destruction of confidence, from whatever source the blow may come, will always injure general business. It will be marvelous indeed if Continental activity in the iron trade is not materially checked. Let us hope that the effect of the Russian crash may not be more severe or more widely extended.

Contracts Are Not Meaningless Documents.

"A contract is a contract" is the epigrammatical business principle conspicuously displayed in a handsome frame suspended over the desk of a department manager of one of our leading steel companies who has charge of the disposal of the material manufactured from a by-product resulting from steel manufacture. It hardly seems possible that the "jug-handled" contract has so thoroughly established itself in the steel trade as to make it necessary to proclaim silently but positively to prospective customers that the contract is what the word implies and not a document to be toyed with according to the whims of the market. It is refreshing to note that merchant furnace operators are more generally securing compliance with the terms of their contracts. It is to the credit of many consumers that they take their material regardless of the swing of the price pendulum. On the other hand, they insist on a strict compliance with contract terms with the producer. Nevertheless, many unpleasant and disagreeable features accompany-

ing radical price advances and declines are being eliminated.

Naval Shops of the Near Future.

The tendency to increase greatly the size of battle ships and toward greater speed and heavier guns, or rather a greater number of the heaviest type of guns, must have an important effect upon the equipment of the naval workshops. The disapproval of the smaller sizes of guns which now constitute important parts of the main batteries of battle ships and replacing them with more guns of heavy caliber bring forward the necessity of large additional and more powerful equipment for manufacturing and handling the heaviest ordnance, gun mounts, the projectiles and the various parts which enter into the construction of the vessel in order that there may be sufficient stability to stand the enormous strain of such weapons. More powerful engines must be provided and provision must be made for their repair. Everything connected with the ship must be larger and heavier.

All these probable factors suggest for the immediate future long strides ahead in the equipment of naval shops, not only those of the Government but private yards. Abroad the naval powers have begun to build prodigious battle ships, probably larger than our Government will attempt until after the value of such leviathans has been better established than it is to-day. Secretary Bonaparte in his recommendations to Congress, allusion to which is made in another column, speaks for the 16,000-ton ship as being amply large enough for the present, but he agrees that this type should carry the heaviest possible armament, and what has been said here regarding the necessity for increased shop equipment must apply to a large extent to our own navy. In his report the Secretary asks for large sums of money for additional shops, and doubtless if the desired appropriation is made the new equipment will show a material increase in the capacity of work handled as compared with most of the tools now in use for similar purposes.

The Russian-Japanese War has brought with it a sharp controversy as to the best type of battle ship, taking into consideration the four important factors, gun power, armor protection, speed and coal capacity, which latter factor determines the radius of activity. England, Germany and Japan have already taken steps toward building what may be called experimental battle ships of 18,000 tons. The British Dreadnaught will carry 12 10-inch guns and will have a speed of 21 knots. Japan will build two ships of this size and Germany one. This will be by no means the limit of size, according to some naval authorities. One of the Japanese experts maintains that the ideal fighting ship should be of 22,000 tons, of 20 knots speed, carrying 14 10-inch guns. Bradley A. Fiske of the United States Navy, in his prize essay of the Naval Institute, argues that the battle ship should be of 20,000 tons burden and 18 knots speed and should carry a similar battery of heaviest guns. While naval authorities disagree on the question of maximum tonnage and its resultant possibilities no one disputes the fact that the 6, 7, 8 and 10 inch guns should be replaced as far as possible with those of the larger caliber, and to accomplish the production of a sufficient number of these weapons should mean corresponding increase in the machines which make them.

An important recommendation in Secretary Bonaparte's report is that private companies be encouraged in the manufacture of armament and munitions of war generally. Armor plate, gun mounts, projectiles and many other parts of the fighting equipment of a battle ship are already manufactured outside of the Government shop, but the Secretary suggests that this custom be extended still farther.

The Machine Tool Builders.

A special meeting of the National Machine Tool Builders' Association was held at the Hoffman House, New York, Monday and Tuesday, December 4 and 5, with a representative attendance of members. Important questions were up for consideration, the call for the meeting comprising three general topics upon which action was to be taken—namely, advancing prices on machine tools; the report of the joint committee of the association and the National Supply and Machinery Dealers' Association, and the question of whether manufacturers should sell machine tools to educational institutions at the same price that they sell to dealers. President E. M. Woodward, Worcester, Mass., was in the chair. Paul A. Montanus, Springfield, Ohio, son of Secretary P. E. Montanus, was the acting secretary in the absence of his father. The members present, together with the representative of each, were as follows:

Hendey Machine Company, Torrington, Conn., C. H. Alvord.
Prentice Bros. Company, Worcester, Mass., A. E. Newton.
F. E. Reed Company, Worcester, Mass., F. E. Reed.
Woodward & Powell Planer Company, Worcester, Mass., E. M. Woodward.
Norton Grinder Company, Worcester, Mass., Georg I. Alden.
Flather & Co., Incorporated, Nashua, N. H., H. L. Flather.
Mark Flather Planer Company, Nashua, N. H., Mark Flather.
W. P. Davis Machine Company, Rochester, N. Y., W. P. Davis.
The American Tool Works Company, Cincinnati, J. B. Dean.
Bradford Machine Tool Company, Cincinnati, George F. Stewart.
Bickford Drill & Tool Company, Cincinnati, H. C. Hoeffinghoff.
Dietz Machine Tool Company, Cincinnati, William Lodge.
Lodge & Shipley Machine Tool Company, Cincinnati, William Lodge.
R. K. LeBlond Machine Tool Company, Cincinnati, R. K. Le Blond.
Hamilton Machine Tool Company, Springfield, Ohio, Charles F. Hilker.
Springfield Machine Tool Company, Springfield, Ohio, Paul A. Montanus.
Builders Iron Foundry, Providence, R. I., V. F. Hatch.
Bullard Machine Tool Company, Bridgeport, Conn., E. P. Bullard, Jr.
I. H. Johnson, Jr., Company, Incorporated, Philadelphia, I. H. Johnson, Jr.
Chandler Planer Company, Ayer, Mass., George J. Burns.
Whitcomb-Blaisdell Machine Tool Company, Worcester, Mass., Charles E. Hildreth, Charles E. Thwing.
Colburn Machine Tool Company, Franklin, Pa., L. H. Colburn.
Baush Machine Tool Company, Springfield, Mass., C. J. Wetsel.

The meeting proved one of unusal interest and importance, not only for what was accomplished but also because of the decision not to act favorably upon the joint report of the committees of the manufacturers and the dealers. This report was thoroughly discussed before it was committed to the table, where it now remains. As it includes the provision for exclusive territorial rights for dealers in machine tools the old arrangement will continue, each manufacturer making his own agreement with his dealers.

The association and its several sections, each comprised of manufacturers of some one line of machine tools, decided in favor of advancing prices. The lathe and radial drill manufacturers voted to advance prices a sufficient amount to cover the increased cost of labor. The manufacturers of upright drills will meet in the immediate future to readjust prices.

A number of planer builders had already advanced prices, as has been noted in *The Iron Age*, and this section agreed that those members who had made no changes in price will make an advance corresponding to that of their associates. The planer builders will meet again within a short time to adjust prices of attachments to planers.

The builders of boring mills took no action because a majority of their number was absent. However, a meeting of the section has been called for next week, when a readjustment will be made, probably along lines similar to those followed by the builders of other types of machine tools.

No action was taken by the manufacturers of shapers. Neither was there a report from the horizontal boring mill section, none of its members being present. The only report from the grinding machine builders was that of the Norton Grinding Company, Worcester, Mass., that it had advanced prices by removing the discount of 10 per cent. from list price which had previously been made. No report was necessary from the milling machine section, as the advance in prices had already been made.

Monday forenoon was given up to a general discussion of the several topics, no action being taken excepting in the matter of sales to educational institutions. It was voted that the members of the association recognize these institutions and assist them in the matter of prices up to a certain point by concessions that may be fair to both dealer and manufacturer.

President Woodward resigned the chairmanship of the Committee on the Standardization of Electric Motors for Machine Tools because of his office as head of the association. He appointed William Lodge to succeed him.

The remainder of the day was devoted to the meetings of the several sections sitting as committees and these meetings continued into Tuesday morning.

At the Monday meeting considerable attention was given to the subject of scarcity of skilled labor, the discussion taking the form of methods of training young men to provide against a repetition of the present very urgent need for the services of expert mechanics. The Committee on Apprentices had been asked for a report, but expecting no such request at this special meeting was unprepared. William Lodge, Cincinnati, thereupon spoke of the excellent work that had been accomplished by the Ohio Mechanics' Institute, Cincinnati, in which the machine tool builders of that city have shown much practical interest. He gave as an illustration two boys who went from the school to the Lodge & Shipley Works. They were found to have advanced at the Institute much beyond apprentices of the shop and to-day they have so outstripped their fellows of the apprentice system that both are now in charge of work as foremen. President Woodward then introduced Professor George I. Alden, Worcester, Mass., as the president of the Worcester Educational Association, which body has for its purpose the education of young men, especially high school boys, in the mchanical arts. Professor Alden gave a very interesting talk along the lines similar to those followed by Mr. Lodge.

The Dreses Machine Tool Company, Cincinnati, was elected a member of the Association.

Foreign Trade Notes.

Foreign Rails for Pacific Coast Lines.

The railroads under Harriman control are to utilize large quantities of steel rails of foreign manufacture. Nearly 35,000 tons have already been contracted for and the placing of further substantial orders is reported to be pending on the other side. The contract for 21,000 tons which was closed last month with a Spanish maker, the Altos Hornos de Viscaya, is intended for one of the Harriman lines in California. These rails are to be all delivered by the end of January. Five thousand tons are now on their way from Bilbao to Galveston, Texas, by special steamer, and the balance will be shipped direct to San Diego, Cal.

For the Southern Pacific's extensions in Mexico a large contract for rails has been placed with the Monterey Iron & Steel Company, Monterey, Mexico. This is the third time the Southern Pacific Company has purchased rails outside of the United States for the lines in the southern republic. The first order was placed with German mills and the second with a Spanish firm. The placing of the first two orders was merely a case of lower prices, but the closing of the Monterey contract is said to be due largely, if not entirely, to the recent duty imposed on foreign iron and steel entering Mexico. The Mexican price is around $33 a ton, whereas the best ruling quotations for American rails laid down in Mexico is about $40 a ton, the duty and freight being almost $15.

Another Mexican contract for 14,000 tons was offered the Monterey Company, but the delivery terms were not suitable to the railroad company and the order was placed with the Altos Hornos de Viscaya of Bilbao, Spain. The price is a shade above $22, f.o.b. Bilbao. Of course these rails will also have to pay duty according to the existing Mexican tariff, so that, together with freight charges, they will cost about $35 a ton, delivered, or about $5 a ton less than the prevailing price for American rails laid down in Mexico.

Advices from Mexico City are to the effect that it is confidently expected that the import duties will very shortly be largely reduced if not removed entirely. The Mexican Government is understood in well informed circles to have decided to order a sweeping revision to be made in the existing tariff with a view to encouraging railroad building and other construction work which is now largely hampered owing to the heavy import duties, the Mexican iron and steel plants being only able to supply a small part of the big quantities required.

The Monterey Iron & Steel Company, which operates the largest works of their description in Mexico, quotes beams at $50 (gold) a ton, whereas the imported product costs $75 a ton. On bar iron the Mexican product costs $70, against $110 a ton for the foreign.

More American Rails for Australia.

Another contract has been placed within the last few days for rails to be shipped to Australia, the Commissioners of the New South Wales Government railways having closed a contract with the United States Steel Corporation through the Australasian merchant house of R. W. Cameron & Co., New York, for about 6000 tons. The rails will be of 80 pounds weight. Deliveries are to begin inside of 30 days and the whole lot is to be shipped within three months. The New South Wales Government railroad system, which is upward of 3000 miles long, has more closely followed American methods of construction and operation than any foreign road. American rails, cars, locomotives and bridges are used almost exclusively.

Since the placing of the contract some two months ago with the Lackawanna Steel Company for an almost similar quantity of rails for the Victorian State Railways the ocean freight rates to Australia have increased nearly 100 per cent. owing to the American and British shipping companies, who have fought each other for some years, having arrived at a working agreement. The Lackawanna rails, one shipment of which went forward last week, will be carried from New York to Melbourne for 15 shillings a ton, plus 66 cents a ton lighterage at this end. The rate by rail from Buffalo is $2.80 a ton, so that the total transportation charges will be a shade above $6 a ton.

The new contract for rails for the New South Wales roads will be subject to an ocean rate of 27 shillings and 6 pence a ton, which will make the total freight charges, &c., upward of $10 a ton.

Railroads Inquiring for European Cars.

Owing to the fact that the unprecedented contracts recently placed with the various car building plants throughout the country preclude the filling of any big new orders for some months to come, it is reported that one of the leading Eastern railroads is making inquiries in Europe, both in England and on the Continent, with a view to placing a substantial contract for prompt delivery.

It is estimated that the different railroad equipment companies, comprising the American Car & Foundry Company, the Pressed Steel Car Company, the Pullman Company, the American Locomotive Company, the Baldwin Locomotive Works, &c., have now on their books unfilled contracts representing an aggregate of almost $250,000,000. The American Car & Foundry Company is understood to have sufficient business in hand to keep its various shops working at full capacity until the spring of 1907.

The Administrative Council of the National Metal Trades Association has fixed March 21 and 22, 1906, as the time of the next annual convention of the association. It will be held at Cleveland, Ohio.

The Safeguarding of Life in Theatres.*

From the Standpoint of an Engineer.

It is a fair and moderate statement that fire protection as applied to theatres and buildings of public congregation is from 10 to 20 years behind the fire protection of large industrial works, and true that the fire hazard to theatre property in general, as measured by insurance rates, is ten times as great for the modern theatre as for the modern factory. All of this is unnecessary. The safeguards needed are mostly simple; the main features of some of them are already worked out in the great factories, and the additional safeguards required to be worked out or adjusted for this special case are the automatic smoke vents, the safe proscenium curtain, the safe warming and ventilation and the proper arrangement of automatic sprinklers on stage and in dressing rooms and storerooms. In the factories of New England chiefly there are the most advanced methods of fire prevention anywhere to be found.

In the course of my own studies of the theatre and auditorium problem I have seen almost everywhere conditions affecting the safety of life that would not be tolerated for a moment by the managers of our best industrial works. For example, I have seen in one of the best New York theatres the wedge shaped space beneath the sloping floor of the auditorium used as a storeroom for trunks and properties. This room was also the plenum chamber for the ventilation. Suppose that any cause should start even a slow smouldering fire in this room; the smoke rising through the air ducts in the floor might throw the audience into a panic and cause great loss of life. In one of the most famous halls in America I found the portable wooden flooring used to transform the main seating space into a ballroom, stored in a dark passageway which formed the main air chamber between the heating coils and the concert hall, all thus kiln dried to perfection, and when I showed it to the manager and to an intelligent aldermanic committee and urged its immediate removal they saw no danger and thought me hypercritical and could not even see that automatic sprinklers would be of use in such a concealed storage space. In Chicago, within a few months after the appalling disaster at the Iroquois Theatre, the aldermen rescinded the rule calling for automatic sprinklers over the stages and rigging lofts of the theatres because the managers believed they "wouldn't do any good" and "might start a panic should one happen to open prematurely." Every factory manager or mill engineer will admit the absurdity of such a statement. In Boston the law still accepts the non-automatic sprinkler pipe, to be opened by hand, a device which has now been generally discarded in factory fire protection, in favor of the automatic. Most important of all, I have found behind the scenes and in the mechanics' rooms a lack of the scrupulous neatness and order that characterizes a modern well organized factory, have found a multitude of dark, concealed spaces used as catch alls and an apparent lack of appreciation by owner and architect that a flood of daylight in storerooms, workrooms and dressing rooms is the best of all safeguards by making dirt, disorder and dangerous rubbish conspicuous.

The Example of the Iroquois.

I first became actively interested in this question by the burning of the Iroquois Theatre, at Chicago, a little less than two years ago. I examined the structure before any of the wreckage had been moved, listened to evidence before the coroner's inquest, counseled with the Mayor and committee of the Board of Aldermen, questioned eye witnesses and inspected many other theatres in the effort to reach a clearer understanding of their special hazards. This fire occurred when the theatre was crowded. The firemen were on the ground within little more than five minutes from the first alarm, but even by that short time most of the victims had already become suffocated.

The scene of this appalling disaster was the newest of Chicago's theatres, a building of fire proof construction that justified the name so far as the building itself was concerned. Little except scenery, decorations and upholstery was damaged. It is true that there had been shameful neglect in important details of fitting up, that fire hose on the stage had been delayed and that fire pails and soda water fire extinguishers were absent, and that the ventilating skylights over the stage were blocked so they could not slide open, and that exits were poorly marked; but I have come to believe that had these all been in the condition commonly found in American theatres the result of the fire might have still been appalling.

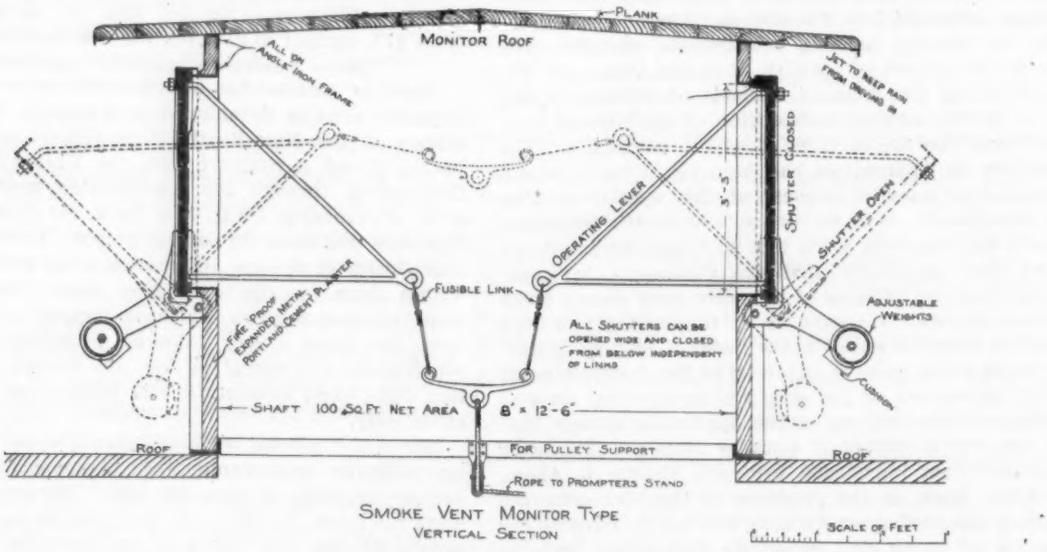


Fig. 1.—A Monitor Type of Smoke Vent Designed by the Author.

The great lesson of the Iroquois fire was only a repetition of a lesson that has been given several times before and each time forgotten. The recurring formula is:

A stage crowded with scenery.

The sudden spread of the flames over this scenery.

The opening of a door in the rear of the stage, an inrush of air.

Scant smoke vents over the stage, an outburst of smoke under the proscenium arch.

Death to those in the galleries.

The obvious suggestion might be: Make the scenery incombustible; but the efficient fire proofing of scenery, so that it will not all burn up if a fire once gets well started on the stage, simply appears to be impracticable.

Concerning the Smoke Vents.

The ordinary construction with a high, spacious chamber for the hanging loft above the level of the proscenium arch makes it a simple matter structually to keep this fire and smoke out of the auditorium, and no matter how great the mass of flaming scenery a smoke vent of one-eighth or one-tenth the area of the stage, if instantly

* Abstracts from President John R. Freeman's address at the annual meeting of the American Society of Mechanical Engineers, December 5, 1905.

opened, would probably prevent suffocation. The conditions are similar to those of a fireplace. The high space over the stage screened by the arch is adapted to give the best of chimney draft. An ordinary rule is to make the throat of the chimney at least one-tenth the area of the fireplace opening, or the space through the damper one-eighth the area of the hearth, and when we simply provide an adequate chimney area and a damper that will surely open we shall have adopted a safeguard that would have saved four-fifths of those who perished at the Iroquois, regardless of defective curtain, defective exits and absence of fire hose on the stage.

In a way it has long been recognized that there should be a large ventilator over the stage, and one city has copied from another the building law that in New York City reads:

> There shall be provided over the stage metal skylights of a combined area of at least one-eighth the area of the stage, fitted with sliding sash and glazed with double thick sheet glass, . . . the whole of which skylight shall be so constructed as to open instantly on the cutting or burning of a hempen cord. . . . Immediately underneath the glass of said skylight there shall be wire netting, . . . &c.

The evident purpose of the thin glass is to cover the opening with something that will break out under heat if the mechanism for sliding off the cover fails. The wire netting is to prevent broken glass from falling to the stage. The idea of a large ventilator is all right, but the execution is commonly all wrong and needs some good engineering to provide a design of damper with careful details that will be sure to work. Note the antiquated suggestion of the burning of a hempen cord when fusible links have been used on the fire doors in your factories for 20 years. And in one of the newest and best New York theatres I found the ventilator had a broad sheet of heavy canvas laced tightly across its opening with marline because the cracks around the ventilator let in too much cold air. The requirement of thin glass in the building law is well meant, but it would be too slow in breaking out and the wire netting called for is a positive danger as often applied.

Fusible Links.

These links have been in common use on automatic fire shutters in our factories for nearly twenty years. It is strange, almost beyond belief, how slowly and scantily these have found their way into the fire protection of theatres. These links melt open at about 162 degrees Fahr., and thus will open long before flame reaches them. Their cost is trifling. Links will break under a load of about 200 to 500 pounds, but can be trusted to sustain continuously a load of only about 50 to 100 pounds. All of the known solders that fuse at low temperature are subject to stretching or "cold flow" under long continued load, unless these loads are made extremely small, and one of the most important features in the design of any such link is to make the direct stress upon the solder small and in tension over a large area rather than by shear. The links will open with about the same promptness as an automatic sprinkler. At the top of the rigging loft over a fire like that on the Iroquois stage they probably would open within 20 to 40 seconds after the blaze got a good start.

Smoke Vent Design.

To illustrate that the problem of smoke vent design can be solved along various lines I have worked out two models shown in the accompanying drawings. It is best that the total area of one-tenth the stage be subdivided into four independent units.

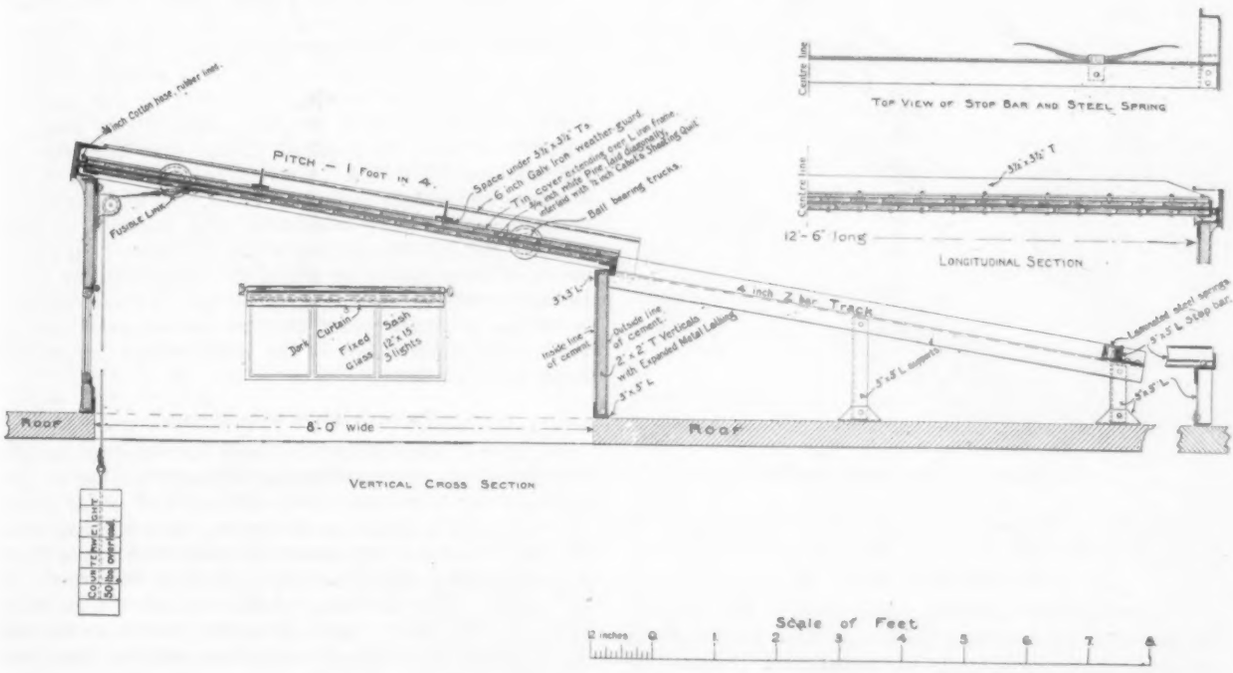


Fig. 2.—A Smoke Vent with Sliding Cover Designed by the Author.

The fundamental requirements are as follows:

Absolute certainty of opening by force of gravity, in spite of neglect, rust, dirt, frost, snow or expansion by heat, twisting or warping of the framework, quickness of opening to be secured by automatic links of the thinnest metal practicable and also by controlling the doors by a cord run down to the prompter's stand and to the station of the stage fire-guard; the operative mechanism of the smoke vent should be simple and massive; it should be of such form that it can be tested daily or at least at the weekly inspection by partially opening it, preferably closing it again by means of the cord running to the prompter's stand. It may add to its safety if it can be used whenever needed for the ordinary ventilation of the stage, thereby keeping it under constant notice.

In the first of these designs submitted, shown in Fig. 1, the 8 x 12 foot opening, of which four would be needed over the stage of ordinary size, has a roof for protection from rain and vertical sides that contain four small windows for admitting daylight to the rigging loft, but which can be closed by ordinary window shades for dark scenes. All necessity for the wire screen is avoided. The four shutters fall outward lest the pressure of the updraft tend to hold them shut, and are pulled open by force of gravity, opening to the full area called for. The pull on the rope holds them against their seat, which,

if made with a thin edge pressing loosely against fibrous material, as shown, will be more tight against cold air drafts than a common window sash or house door. Fusible links are inserted in each of the four branches of the cord. No sprinkler should be placed up within the monitor containing these links, and care should be taken that the links are of a thin, quickly sensitive type.

In the second design, Fig. 2, the sliding type is used. This obviously cannot be used as an ordinary ventilator in rainy days. The special effort in remodelling this from the current New York type has been, first, to place the glass in the vertical side so that no necessity for a wire screen remains. Second, to provide a better track and trucks and arrange the joints so that the leakage of air through the clearance space would not tempt the janitor to close the space by something that may interfere with the sliding open.

Fig. 3 shows an arrangement of a safety ventilating

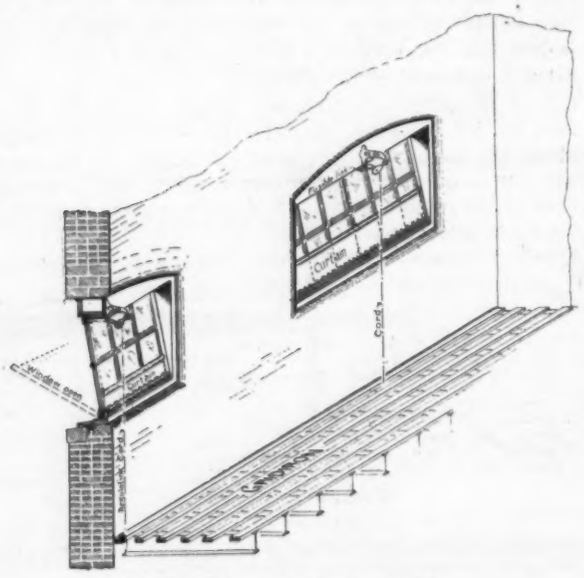


Fig. 3.—Safety Ventilating Shutters.

shutter that sometimes can be conveniently placed in the brick wall near the top of the rigging loft.

Automatic Sprinklers.

The safeguard second in importance is the complete equipment with automatic sprinklers over the stage and throughout all rooms except the auditorium. I unhesitatingly recommend them as the best means for promptly controlling a fire that has once got good hold in the scenery upon the stage of the theatre. It has been claimed that under the high rigging loft of a theatre sprinklers at a distance of 60 or perhaps 80 feet above the floor would not open with sufficient promptness to be of material service. I am confident that this is untrue. The hot air from a fire quickly travels over a vertical distance of 60 or 80 feet. Not more than five to ten seconds' time would be required for this, and the conditions for pocketing and confining the heat to a small area in the top of the rigging loft of a theatre are much more favorable than in many portions of factories where sprinklers are found to work successfully. The rainfall from a series of automatic sprinklers with 80 square feet to the sprinkler and ordinary water pressure would be about 25 inches per hour. One series should be placed below the gridiron and preferably another series above it, these not being vertically over one another. A line should also run along the lower outer edge of each fly gallery. The 162 degree sprinkler should be used.

Fire Curtains.

The third of the safeguards is the curtain for closing the proscenium arch. The fire curtain for covering the opening under the proscenium arch in nearly all American theatres outside Chicago at the present time is made from a heavy canvas woven from asbestos fiber. In Chicago the Aldermanic Committee has made the steel curtain the rule. In the present state they merit little criticism except the absence of a positive down haul and better holding and guiding in iron channels at the edge. Like nearly all steel ribbed shutters they will warp and twist off their seats under 10 to 15 minutes' exposure to a severe fire unless securely held at the edges, and should smoke vents be closed and sprinklers lacking and a back door open their loose fit would let volumes of suffocating smoke and tongues of flame pass into the auditorium. With the smoke vents open and the draft therefore inward, they will serve their purpose until the audience has escaped and the firemen have arrived.

We experimented upon sundry combinations of asbestos, asbestos felt and asbestos cement with thin steel plate and combined with wire netting, the asbestos being placed on the stage side, and it was plain that the steel curtain protected with some asbestic material on the fire side possessed far greater strength and endurance against fire than the simple asbestos. With care given to the design of the guides and fastenings at edges and top, so that after it was lowered the curtain could not be pulled out by warping, buckling, "smoke explosions" or pressure of air, the steel curtains would probably hold the fire from entering the auditorium.

The general type of steel proscenium curtain finally adopted in Chicago consists of a light frame work of steel angle irons with corrugated plate about 1-16-inch thick on the auditorium side and some asbestic nonconducting material on the stage side, with an air space of 1, 2 or 3 inches between. Where guided only by loops on vertical cables it is required to lap over the edge of the arch about 8 inches. A structure of this kind of the ordinary size weighs from 2 to 6 tons. The hanging would be improved by more substantial iron channels to hold the edge and by the addition of positive down-haul tackle or some arrangement by which the counterweight could be thrown off, for now the great weight of these curtains is so nearly counterpoised that the air pressure against their surface may prevent the slight excess of gravity from lowering them.

Philadelphia Fire Escape.

A type of fire escape has been developed under the Building Laws of Philadelphia primarily for use in factories, which is so remarkably efficient and so far ahead of safety of anything else that exists, that we may wonder why it has not been copied in other cities. It is somewhat expensive, but the safety it gives is well worth the extra cost. The fundamental idea is that the stairway tower is absolutely cut off from the various rooms and floors which it serves. One must go out from the room into the open air and then enter the stairway. Once within this, he can proceed without danger to the bottom. The same idea can be applied to the fire escape from a theatre.

Weekly Inspections.

In safeguarding our factories against fire, we find systematic inspections and the filing of a weekly report one of the very best means toward safety. They would be of equal value for the theatre. A printed blank can readily be devised for each case. This should cover the completeness and operative condition of all valves, fire hose, sprinklers, fire pails, soda water extinguishers, hooks, fire doors, exit locks and latches, smoke vents, fire curtain mechanism, and particularly of the neatness, cleanliness and order of every room, passageway, closet, air chamber, loft, basement and fly gallery, used as a part of the theatre building. This inspection should be made on each Monday afternoon, since the week end is the time when attractions are commonly changed and the confusion is most apparent.

A private fire brigade from the regular stage hands and ushers should be drilled regularly, the Monday drill to be a "wet drill," testing the stage hose and a few of the soda water extinguishers, which may be turned out of the window to the areaway or into some convenient drain provided for the purpose at the rear of the stage. The head stage carpenter should always be present during a performance as chief of this brigade.

If the municipal ordinance required such reports and drills as just described and that a duplicate of the report

be filed each Monday afternoon with the public fire chief of the district, a single fireman or inspector detailed as instructor to cover all the theatres of a large city would, in my judgment, accomplish more real good than the two stage firemen required by law to be present from the public force, doing nothing in particular, at the expense of the theatre, and who from my factory experience would be less efficient than the trained and responsible stage carpenter. In other words, let the law emphasize fire prevention by inspection more clearly.

The Use of Dissolved Acetylene.

Interesting data concerning the manufacture and use of dissolved acetylene are contained in two papers presented at meetings of the past summer. One was read before the German Acetylene Association by Herr Kuchel, a director of the company which is introducing the dissolved acetylene process in Austria. The other, entitled "Compressed Acetylene," was read before the International Acetylene Association at its meeting in New York in August by Eugene Bournonville of New York, representing the American company handling the same process. The process involves dissolving acetylene at a pressure of 10 to 12 atmospheres in acetone, which is absorbed within the pores of porous material held in steel cylinders. One volume of acetone dissolves 25 volumes of acetylene at ordinary temperatures and atmospheric pressure, the solubility increasing in proportion to the pressure, so that at a pressure of 10 atmospheres one volume of acetone holds 250 volumes of acetylene and at 12 atmospheres about 300 volumes of the gas. These solubility figures, however, are seriously lowered by the presence of foreign matter in the acetone, especially water; and since a cylinder containing the porous matter holding the solution is used in practice an indefinite number of times any impurities in the acetylene tend gradually to accumulate in the vessel, materially reducing its capacity in terms of gas.

The essential feature of the porous matter employed is that it shall neither attack the acetone nor the acetylene and that it shall possess, as accurately as possible, a porosity of 80 per cent.—*i. e.*, that its substance shall occupy 20 per cent. of the space which it appears to fill entirely. Two kinds of porous matter are now employed. In the United States a paste of asbestos in fine fibres and silicate of soda is molded into discs exactly fitting the interior of the cylinders and the discs are then dried. The cylinders are made with separate ends, the discs are put in and the ends are brazed into place. In Austria and elsewhere a paste composed of charcoal and a cementitious material is prepared, run into the cylinders as a fluid and dried inside by gradually applied heat. It then solidifies into a porous mass, free from cracks or holes and exhibiting a specific gravity of 0.3.

The acetone used must be of 99 to 99.6 per cent. purity, distilling at a temperature of 56.3 degrees C. without leaving any residue. It expands in bulk as it dissolves the gas, increasing about 4 per cent. in volume for every atmosphere of pressure, according to Herr Kuchel, so that 1 volume becomes about 1.5 volumes when fully saturated at 12 atmospheres. Mr. Bournonville makes the expansion about 35.8 per cent. for 10 atmospheres. Hence the cylinder cannot be completely filled with liquid. After 20 per cent. of the space has been filled with the porous solid, as above described, the cylinder is charged with acetone till the liquid occupies 43 per cent. of the original space, thus leaving 37 per cent. of the space available for the expansion of the solution and for the retention of some compressed gaseous acetylene.

Dissolved Acetylene for Train Lighting.

The London *Engineer* makes an addition to Herr Kuchel's table, comparing dissolved acetylene, oil gas, oil gas enriched with 25 per cent. by volume of acetylene and electricity derived from lead accumulators for the illumination of trains. The points considered are the weight, bulk and capacity in terms of burner-hours of the apparatus storing the energy. The original table has as one item the compressed oil gas of Germany, which evolves on combustion 4.77 candle-power per cubic foot. As British oil gas evolves 8 candle-power, the *Engineer* adds a line for that gas. The data refer to apparatus in common use in railways and are as follows: To hold 283 cubic feet of oil gas two cylinders are required, 22 inches in diameter, one 8 feet 3 inches and the other 9 feet 6 inches long. Together they weigh 1150 pounds and occpuy a space of 45.3 cubic feet. They are capable of supplying a flame of 16 Hefner units for 96.15 hours, so that their weight per 16 Hefner units is 12 pounds and their bulk 0.47 cubic foot. Sixteen Hefner units are approximately equal to 14 British candle-power. Identical receivers to those already described are necessary to hold an equal volume of acetylene oil gas, but the compressed gas has an illuminative value of 11.8 candle-power per foot—the rest of the calculations may be omitted. An electric accumulator of 32 elements, each having a capacity of 90 ampère-hours at 2 volts, held in four receptacles 15 x 10.6 x 12.3 inches in size, weighs 880 pounds, occupies 9 cubic feet of space and stores 5760 watt-hours. Railway electric incandescent lamps develop 1 Hefner unit per 2.5 watts. To carry 141.5 cubic feet of dissolved acetylene one cylinder 3 feet 10 inches long by 9.3 inches in diameter is needed; this weighs about 181 pounds and occupies 1.77 cubic feet of space. The luminous acetylene burners used in trains develop light at the rate of 35.5 candle-power per cubic foot. Thus the table below is arrived at:

Details of Apparatus Per 16 Hefner Units or 14 Candle-Power Flame.

	Hours of light.	Weight in pounds.	Space occupied in cubic feet
German oil gas, at 4.77 candle-power per foot	96.15	12.0	0.47
British oil gas, at 8 candle-power per foot	161.7	7.1	0.28
Electricity from accumulators	144.0	6.1	0.06
Acetylene oil gas, at 11.8 candle-power per foot	238.1	4.8	0.19
Dissolved acetylene, at 35.5 candle-power per foot	357.14	0.53	0.005

Comparative Costs.

Referring to the relative costs of the different illuminating agents Herr Kuchel's paper gives a detailed estimate of the cost of making dissolved acetylene. He takes a factory having a capacity of some 1000 cubic feet of gas per day of 24 hours, which, he says, can be built for about £1500. Allowing for interest, depreciation and sundry expenses, taking carbide of 300 liters per kilogram gas making power—which he finds under rather than over the actual figure—at 12 shillings 6 pence per hundredweight, calculating the cost of the acetone and reckoning on the dilution of the acetylene with acetone vapor, he makes the dissolved gas cost 1.387 marks per cubic meter—*i. e.*, 1.552 pf. per hour per flame of 16 Hefner units, or 14 British candle-power. Data referring to the other illuminants, in which, however, depreciation on the plant is usually omitted, are published by several Continental railways. The mean cost of oil gas for the same amount of light from the figures of the Etat line in France and the State line in Hungary is 2.548 pf. The mean cost of acetylene oil gas on the Prussian State line and the Kais. Ferdinand Nord line is 1.798 pf., and the average cost of accumulator electricity from the returns of the Friedrich Wilhelm line in Mecklenburg, the Kais. Ferdinand line, the Eastern and the Southern lines in France and the Hungarian State Railway is 8.976 pf. per 14 British candle-hours.

In his paper read at the New York convention Mr. Bournonville deals with the question of cost thus: Pintsch gas costs $5 per 1000 feet of 9000 candle-power. A railway car equipped with five fixtures of four burners each, consuming 1 foot per hour per burner, is provided with 180 candle-power of light, and the cost is 9.99 cents per hour. One short ton of carbide delivered at the works costs $70, to which $5 may be added for the expenses involved in preparing dissolved acetylene. One short ton of carbide yields 9500 cubic feet of acetylene, which develops "50 candle-power per cubic foot." Hence the production of 180 candle-power of light in a railway car costs 2.84 cents per hour. He asserts that several lines in the United States have proved the maintenance of lamps, &c., to be about 35 per cent. cheaper when acetylene is employed than when Pintsch gas is used.

PERSONAL.

W. J. Lewis, formerly of Lewis, Oliver & Phillips, iron manufacturers of Pittsburgh, but who retired from business some years ago, is seriously ill.

Eugene L. Caton has resigned his position as manager of the Pittsburgh department of the U. S. Metal & Mfg. Company, and E. B. Leary has been appointed to succeed him.

Frank R. Ridell, formerly manager of the sales department of the General Fire Proofing Company, Youngstown, Ohio, has resigned and has been appointed assistant general manager of the Art Metal Construction Company, Jamestown, N. Y.

Eli H. Doud, formerly secretary and treasurer of the Acorn Brass Mfg. Company, Chicago, was at the last annual meeting of the company elected its president.

A. B. Conover, who has been connected with the Chicago office of the John A. Roebling's Sons Company for the past 18 years as Western representative and general sales agent, has been elected treasurer and general manager of the Chicago office of this company to succeed the late George C. Bailey.

Joseph L. Hummer, retiring general foreman of the special machine and gasoline engine departments at the Deering Works, International Harvester Company, Chicago, was tendered a farewell banquet November 17 by the Deering foremen and was presented with a clock as a token of their esteem. On November 18 the employees of the special machine department gave him two leather chairs. Mr. Hummer has taken the position of master mechanic at the Studebaker Works, South Bend. Ind.

Frederick H. Stevens will serve as chairman of the Executive Committee of the American Locomotive Company until a successor to the late president, A. J. Pitkin, is elected.

T. Frame Thompson has been elected a director of the Otis Steel Company, Cleveland, Ohio. The other directors are J. E. Touch, managing director; J. T. Smith and Frederick Walker, all of London.

Frank Jeffery, superintendent of the Wyandotte and Bay City, Mich., yards of the American Shipbuilding Company, has been appointed superintendent of the Detroit Shipbuilding Company. Mr. Jeffrey immediately previous to July, 1905, was vice-president of the Union Iron Works of the United States Shipbuilding Company at San Francisco. Before going with the latter company he had been for many years connected with the shipbuilding plants on the lakes.

W. A. Green has resigned as general manager of the Scully Steel & Iron Company, Chicago. He is succeeded by Charles Heggie, who has been connected with the company for a number of years.

Charles A. Olson, who for several years has been superintendent of the flanged fitting department of the Crane Company, Chicago, has been promoted to the newly created position of general superintendent of that company. Mr. Olson was formerly superintendent of the St. Petersburg, Russia, plant of the Societé Anonyme Westinghouse.

W. W. Young, formerly general agent and recently acting purchasing agent, has been appointed purchasing agent of the Union Switch & Signal Company, Swissvalè, Pa.

Nils Anderson, who has been connected with the New York office of Matthew Addy & Co., has succeeded E. B. Blandy as the New York representative of that firm.

John Cassan Wait delivered the Founders' Day address on November 30, 1905, at the Thomas S. Clarkson Memorial School of Technology, Potsdam, N. Y. His subject was "Technical Education of the Twentieth Century."

Following the recent action of the Buffalo Metal Trades Association in favor of merging with the National Metal Trades Association, the Boston Metal Trades Association has made a similar decision. Local associations in Chicago, St. Louis and Cincinnati, in addition to those in Buffalo and Boston, have now decided to become branches of the National Association.

OBITUARY.

WILLIAM I. JONES, secretary and treasurer of the Pittsburgh-Buffalo Coal Company, died at Memorial Hospital, Monongahela, Pa., November 28, from an operation for appendicitis. Mr. Jones was one of the largest coal operators in the Pittsburgh district.

F. CORTEZ WILSON of F. Cortez Wilson & Co., manufacturers in sheet metal, Chicago, died November 28 of pneumonia following a recent operation. He was born in Norfolk, N. Y., May 18, 1836, and moved with his parents to McHenry County, Illinois, in 1844. He went to Chicago in 1853, where he was engaged in business until April, 1861. He served in the Civil War and upon leaving the army was for some time on the Chicago Board of Trade and later with the firm of Mears, Bates & Co., lumbermen. In 1873 he embarked in sheet metal manufacturing and continued actively in this business until a few weeks before his death. He is survived by a widow and four children.

GEORGE M. BALLARD, manufacturer of malleable iron castings, Newark, N. J., died December 4 from the effects of an operation, aged 68 years. He was born in Bloomfield, N. J. When he was 21 years old he joined his two brothers-in-law, William Stainsby and John Barnett, in manufacturing saddlery hardware. In late years he had operated a malleable iron foundry in Newark.

The Shenango Iron & Steel Company.—This company, which was organized some time since by creditors of the Continental Iron Company, with a capital of $200,000, has recently acquired the plant of the Independent Rolling Mill Company, Cuyahoga Falls, Ohio, and will remove it to Wheatland, Pa., where it will be operated in conjunction with the present plant at that place. The works will then contain 16 puddling furnaces, busheling furnaces, a muck bar mill, two finishing mills, 10 and 18 inch, and a skelp mill. The product of the plant will be iron exclusively and will consist of iron bars, sheared iron skelp and muck bar, a part of the latter product to be sold in the open market. It will also roll iron plates up to 50 inches wide and in any of the usual lengths. The present capital stock of the Shenango Iron & Steel Company is $200,000, but this will be shortly increased to $300,000. A part of the plant is expected to be started this month and the whole plant will be in operation shortly after the first of the year. John C. Bole is president, H. A. Ross vice-president and secretary and A. W. Herron treasurer. The offices are on the third floor of the Lewis Building, Pittsburgh.

Not content with harnessing the great Falls of Niagara engineers are now talking about harnessing the lower rapids as well. It is estimated that the discharge amounts to 222,000 cubic feet per second and that the available head between a point ⅛ mile south of the cantilever bridge and one at the lower end of the glen is 80 feet. It is proposed to connect these two points with a tunnel 10,000 feet long on the New York side, and, assuming it possible to convert into electrical energy 60 per cent. of the kinetic energy now dissipated against the walls of the gorge, it is estimated that a total of 1,200,000 horsepower could be obtained. This is double what is now in operation or under construction or contract in all six of the plants centering around the Falls proper.

The Carmania, the first great ocean steamship for the New York and Liverpool service equipped with steam turbines, left Liverpool for New York December 2. The Carmania belongs to the Cunard Line and is a sister ship of the Caronia, recently put in service, but fitted with reciprocating engines. As the Caronia has attained a speed of over 19 knots the performance of the Carmania will be awaited with much interest.

Opening of the Mechanical Engineers Convention.

The registration of members and guests in attendance at the fifty-second meeting of the American Society of Mechanical Engineers began at noon Tuesday, December 5, at the headquarters, which this year are in the Edison Building, 44 West Twenty-seventh street, New York. Tuesday evening the opening session was held at 8.45 in the auditorium of the Edison Building. The annual address by the president, John R. Freeman, on the subject, "The Safeguarding of Life in Theatres from the Engineer's Standpoint," will be found in abstract elsewhere in this issue. The secretary made announcements relative to the entertaining of the society during the convention and the session concluded with an informal social gathering.

SECOND SESSION.

Wednesday morning, December 6, the second session convened at ten o'clock in the main saloon of the Hamburg-American liner Amerika, docked at her pier at Hoboken, N. J. Emil Boas, general manager of the Hamburg-American Line, welcomed the members and guests of the society, and there followed the annual business meeting, comprising the reports of council, tellers and standing and special committees. The latter included

"The Report of the Committee on Standard Proportions for Machine Screws."

The members of this committee were: Wilfred Lewis, chairman; Charles C. Tyler; Horace K. Jones; Geo. R. Stetson; J. F. Madgett, assistant superintendent General Electric Company (representing John Riddell, member of committee), and George M. Bond. The committee held a joint meeting with the following representative screw manufacturers: Chas. Glover, president the Corbin Screw Corporation, New Britain, Conn.; Benj. Thurston, general superintendent American Screw Company, Providence, R. I., and the Worcester Machine Screw Company, and E. O. Goss, treasurer the Scovill Mfg. Company, Waterbury, Conn., and drew up recommendations for standardizing the manufacture of machine screws. These covered the form of thread; diameters; number of threads per inch, standard reference thread gauges, basic and for screws and taps; working gauges for screws and for taps, limits of variation, measured in the angle of the thread; limits of variation in external diameter; limits of variation in the pitch of the thread, screws and taps, and proportions of the heads. The paper embodying the committee's report discussed these subjects in order and concluded with tables listing the standard dimensions proposed.

New and general business occupied the remainder of the business session and was followed by the presentation of a paper by J. M. Whitham on the use of

Natural Gas Under Steam Boilers.

This paper was divided into sections pertaining to the value of natural gas production in the United States from 1890 to 1904, composition of natural gas, the testing of gas meters, the best burners to use, color of the flame, tests of seven boilers, burner tests and the possible efficiency with natural gas. The conclusions were as follows: There is but little advantage possessed by one burner over another. As good economy is made with a blue as with a white or straw flame. Greater capacity may be made with a straw white than with a blue flame. An efficiency as high as from 72 to 75 per cent. in the use of gas is seldom obtained under the most expert conditions. The "air for dilution" is greater with gas than with coal, so that possible coal efficiencies are impossible with gas. Fuel costs are the same under best conditions with natural gas at 10 cents per 1000 cubic feet and semibituminous coal at $2.87 per 2240 pounds. (This is based on 3.5 pounds of wet coal being used per boiler horse-power per hour, or 45 cubic feet of natural gas.) As compared with hand firing with coal in a plant of 1500 boiler horse-power output, coal being $2 per 2240 pounds—considering labor saving by the use of gas— natural gas should sell for about 10 cents per 1000 cubic feet.

EXCURSIONS.

At the conclusion of the discussion of this paper the members and guests were invited to inspect the Amerika, which is the newest and largest passenger steamship afloat. An account of the interesting features of the Amerika was printed in *The Iron Age* October 26, 1905, page 1096.

Wednesday afternoon a special train on the Lackawanna Railroad conveyed the party to the new Henry R. Worthington Hydraulic Works at Harrison, N. J., where a luncheon was served, after which the visitors were conducted in groups about the works. An extensive description of this plant was given in *The Iron Age* October 12, 1905, page 927.

Photography of Invisible Phenomena

was the subject of an illustrated lecture by Prof. R. W. Wood of the Johns Hopkins University, given Wednesday evening in the auditorium of the Edison Building. The lecture was of a particularly interesting character and so popular in its appeal that the ladies and guests were invited to enjoy it with the members.

At the time of going to press the registration of members and guests had reached 1050.

NEWS OF THE WORKS.

Iron and Steel.

The Carbon Iron & Steel Company, Parryville, Pa., blew in its Carbon Furnace November 27.

The New York State Steel Company, Buffalo, N. Y., broke ground Monday for the foundations for its new plant, which is to contain two Talbot open hearth furnaces and a blooming mill to produce about 400 tons of steel billets per day. The plant is expected to be completed about October 1, 1906. The company is now constructing railroad connections to its plant.

The Phillips Sheet & Tin Plate Company, Clarksburg, W. Va., is completing improvements to its plant which will give it additional facilities for getting out a greater tonnage. The plant is now working to full capacity.

The muck bar mill of the Kittanning Iron & Steel Mfg. Company, at Kittanning, Pa., has started up.

W. H. Conklin, New Haven, Conn., who recently purchased from the receiver of the Omega Steel Company its secret process for the manufacture of steel, has organized a new company to be located at Ansonia and to be known as the Omega Steel & Tool Company. Among the incorporators is Charles Hudson, who was identified wth the former company.

General Machinery.

The Cape Ann Tool Company, Pigeon Cove, Mass., manufacturer of drop forgings, has installed a gas plant at its works, the contract being given to the Acme Gas Company, Chicago.

The Omaha Machinery & Construction Company, Omaha, Neb., recently incorporated, has opened quarters at Tenth and Douglas streets, where it will carry a line of new and second-hand machinery. D. J. Henchy is president; T. H. Fritts, secretary and treasurer, and Frank Daley, manager.

The Red River Furnace Company, Clarksville, Tenn., is to install a machine shop with a floor space of about 5000 square feet and foundry covering about 4000 square feet of floor space. The buildings will be of mill construction and will be equipped with new machinery, all of which has been purchased.

The assets, patents and good will of the Arctic Company, a part of the Aultman Company, Canton, Ohio, has been sold by the receivers to Cleveland and Canton people, and a company known as the Arctic Machine Company, capital stock $400,000, has been formed with the following officers: Gordon M. Mather, president and manager; A. R. Horr, secretary, and Frank T. Zollinger, treasurer. Other important stockholders are E. G. Tillotson, F. H. Goff of Cleveland, H. H. Timkin, A. B. Clark, W. C. Labin and R. W. Gallagher of Canton. The Cleveland people are bankers while the Canton men are all prominently identified with manufacturing enterprises in that city. The company will manufacture ice machines, using the plant formerly owned by the Aultman Company, from which company the new concern is entirely divorced.

The E. H. Mumford Company, manufacturer of molding machines, Philadelphia, reports the sale of six 12-inch plain power ramming machines to the Pennsylvania Railroad Company for use in its shops at Altoona. Combination jar ramming and pattern drawing machines have been ordered by a number of parties, and the local demand for plain power rammers has greatly increased. Recent deliveries of machines by this company include those of the power ramming, split pattern, vibrator frame and jar ramming types.

Power Plant Equipment.

The United States Frumentum Company, Detroit, Mich., is making improvements to its plant and is installing a 1000 horse-power tandem compound Corliss engine made by Hooven, Owens & Rentschler, Hamilton, Ohio; a vertical jet condenser, by Dean Brothers, Indianapolis; shaft, hangers, pulleys furnished by Palmer-Bee Company, Detroit.

The Rimmon Mfg. Company, Seymour, Conn., manufacturer of metal goods, is erecting a three-story building, 30 x 40 feet, the lower floor to be used as an engine room and the upper stories for additional storage room. A 125 horse-power Hewes & Phillips engine will be installed, the present engine capacity having been outgrown.

Foundries.

The Prescott Company, Menominee, Mich., expects to have its new foundry completed by March 1. Equipment is now being installed.

The A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo., has incorporated with a capital stock of $10,000, fully paid in. The company is successor to A. Gilbert & Sons, brass founders, manufacturers of car and engine brasses, babbitt metals, solder, bar lead and similar products and dealers in metals of all kinds. Charles F. Gilbert is president.

Plans are being prepared by the Hydraulic Machine Company, Pittsburgh, for an enlargement of its plant in that city, which will be followed by a change in the method of operating. The company has manufactured steel castings and has an iron and brass foundry. The plan is to separate the steel casting business from the rest and operate under a separate company, to be chartered and known as the Iron City Steel Castings Company.

The Sharon Foundry Company, Sharon, Pa., works at Wheatland, Pa., announces that its new furnace is in successful operation and that it is now making acid open hearth steel castings and is prepared to execute orders promptly.

The Standard Steel Car Company, Pittsburgh, works at Butler, Pa., has made application for a charter for a new company, to be known as the Standard Steel Car Wheel Company, which proposes to erect a plant at Butler, Pa., for the manufacture of steel car wheels.

Fires.

The silk mill of E. W. Turner & Co., Turnerville, Mass., was burned November 28, including a new engine and machinery. The loss is set at $10,000.

The shops of the Florence & Cripple Creek Railroad at Canon City, Col., were recently destroyed by fire. The loss is placed at about $25,000.

The recent fire at San Francisco, Cal., seriously damaged the plants of the Union Iron Works and the Golden State Miners' Foundry Company. The total loss will amount to about $100,000.

The car and blacksmith shops of the Prince Edward's Island Railroad, at Charlottetown, P. E. I., were burned November 29, with an estimated loss of $60,000.

The plant of the Walsh Brake Shoe Company, East Moline, Ill., was recently damaged $20,000 by fire.

The plant of the Illinois Match Company, Joliet, Ill., was destroyed by fire November 29. The loss is placed at $50,000.

The shoe factory of the Landis Shoe Company, Palmyra, Pa., was destroyed by fire last week. The loss is about $50,000.

The foundry of A. C. Thompson & Co., at Bridgewater, Nova Scotia, was recently destroyed by fire. The loss is placed at about $20,000.

The boiler house and engine room of the Double Truss Cornice Brake Company's plant, Buffalo, N. Y., were destroyed by fire December 1. Some machinery was damaged also. Loss about $5000.

Hardware.

The Union Steel Screen Company, Limited, having outgrown its present quarters at Jackson, Mich., will remove to Albion, Mich., where a more suitable building was secured than could be found in the former city. The company is incorporated with a capital stock of $200,000 and manufactures, in addition to the Union interlocking system of concrete reinforcement, sand and coal screens, elevator inclosures, oven racks and wire and iron work. Some new lines are to be added at the new plant, one of which will be a portable tool room inclosure, which will be placed on the market about the first of the year.

The Cleveland Hardware Company, Cleveland, Ohio, manufacturer of carriage hardware, forgings and specialties, is taking possession of a new machine shop, 80 x 330 feet, five stories high. The company has been buying considerable new machinery and will install more from time to time as it works up to the capacity of the new shop.

Woodhouse Chain Works, Trenton, N. J., reports business as very good, orders coming in freely, in fact faster than it can take care of them, although the plant is being run overtime to secure prompt shipment if possible. The manufacturer is making a special high grade dredge and steam shovel chain, to which particular attention is called and for which very high claims are made as to strength and durability.

The International Silver Company has planned a new building for its plant at Wallingford, Conn., to be 40 x 150 feet. One story will be built at present, the building to be arranged for additional stories when the room shall be required. The building will be used in part for coffin hardware and in part for other lines of manufacture.

T. & H. Smith & Co., Pekin, Ill., who for a number of years made nothing but farm wagons, about a year ago commenced to add farm implement specialties. In addition to wagons and trucks they are now manufacturing bob sleds, endgate sowers, shoveling boards, steel lawn swings, harrow carts, portable farmers' elevators and grain dumps.

Business with the United States Horse Shoe Company, Erie, Pa., has increased so rapidly that the company has found it necessary to enlarge its plant, and has just placed a contract with the McClintic-Marshall Construction Company of Pittsburgh for an extension of 40 x 70 feet to its mill building and an extension of 40 x 60 feet to its warehouse, both of steel construction. The contract calls for completion by January 1. This will give the company a mill building 70 x 340 feet and a warehouse 40 x 160 feet, in addition to machine shop 30 x 60 feet and scrap house 30 x 100 feet, and will place the company in position to take care of all orders promptly.

Miscellaneous.

The Winkley Company, Hartford, Conn., manufacturer of oiling devices for machine tools, engines and automobile work, Garlius carburettor and Eureka separator, has decided to move its business to Detroit, Mich., where it will have much larger quarters. The company will move during the holidays, so that it will be prepared to fill all orders from Detroit on and after January 1.

The plant of the Acheson Siloxin Articles Company at Niagara Falls, N. Y., is approaching completion, and it is expected will be in readiness to commence operations January 1. Niagara electric power in large quantities will be used by the company in its process of manufacture.

The American Locomotive Company has purchased the wells of the Dunkirk Natural Gas Company, and will at once connect the mains with the shops of the Brooks plant at Dunkirk, N. Y., and use natural gas for fuel hereafter.

The Sandstrom Short-Turn Gear Company has been organized at Indianapolis, Ind., and incorporated with $100,000 capital stock. The directors are Clemens Vonnegut, Jr., of the Vonnegut Hardware Company; Theodore Sandstrom, Alfred F. Potts, Chas. J. Schuh and William H. Sherry. The company will manufacture vehicles with a short-turn gear, consisting of a fifth wheel on the back axle and connected with the front fifth wheel so that they work automatically together and keep the front and back wheels in line. The vehicle can make a turn in half the usual space, there is no chance of overturning it, and the back wheels escape all obstacles, such as the curb, that the front wheels pass. There are other advantages. The company will lease or build a factory.

Fox Bearings, Limited, Woodbridge, Ontario, has incorporated with a capital stock of $40,000. The company will manufacture the Fox antifriction bearings patented by T. Fox. The incorporators, in addition to Mr. Fox, are Thomas Sullivan and John Nicol of Pine Grove, Ontario.

Henry D. Atwood, former owner and manager of the Phœnix Crucible Company, whose works at Taunton, Mass., were recently burned, is to locate his crucible business elsewhere than Taunton, but no decision as to location has been made, several propositions being under consideration.

The Big Sandy Crate Mfg. Company, which was recently incorporated at Big Sandy, Texas, is erecting a new plant. The company is in the market for a drag saw. It has already purchased a 64-inch veneer lathe from the St. Joseph Iron Works, St. Joseph, Mich.; boiler and engine from the Atlas Boiler & Engine Works, Indianapolis, Ind.; saw mill plant from the Adams Machinery Company, Corinth, Miss.; lighting plant from Fairbanks, Morse & Co., and other machinery from the J. A. Fay & Egan Company, Cincinnati, Ohio.

The Burns Mfg. Company, Boston, Mass., has been incorporated in Massachusetts with authorized capital stock of $150,000, to manufacture jewelry. The officers are: President, George E. Burns, Central Falls, R. I.; treasurer, Eugene L. Button, Boston; clerk, Nathan Heard, Brookline, Mass. The company is not yet ready to make announcement of its manufacturing plans. Communications addressed to Mr. Heard will reach the management.

The National Fire Proofing Company, Pittsburgh, has secured a large contract through its London representatives for conduit which is to be used for the purpose of carrying electric lighting wires into Charing Cross and Strand section in London, England. The concern has also received large orders for fire proofing for shipment to South America and is making regular shipments of its product to Europe.

The H. C. Frick Coke Company, Pittsburgh, has bought the Moore tract of 149 acres of coal lands near New Salem, Pa., in the Connellsville region for $900 an acre. This coal land adjoins the Buffington plant of the Frick Coke Company and will be worked from that plant.

The Iron and Metal Trades

While there is less excitement in the Iron and Steel trades, the volume of work coming out continues extremely heavy. No better indication of this could be furnished than by the fact that the bookings of the United States Steel Corporation during November were slightly above 51,000 tons per day, as compared with a little more than 50,000 tons in October. When it is considered that an even much larger tonnage was booked in September, the record month, and that the daily capacity of the works of the corporation is 34,000 tons, the volume of current consumption will be appreciated.

Rail makers again report heavy orders. The St. Paul Road has called for the first installment for its Pacific coast extension, the quantity involved being 60,000 tons, which will be rolled in the Central West in the winter, to be forwarded by sea to the coast. The first installment of the Baltimore & Ohio order, involving 25,000 tons out of an estimated total of 75,000, has been given to the mills.

The leading interest has just closed for 25,000 tons for South America and for 6000 tons for Australia.

Prices of Light Rails have been again advanced $1 per ton and are thus getting more in line with the Standard sections.

Some heavy work is coming to the Structural mills. The Pennsylvania Railroad is calling for bids for 22,000 tons for that part of the New York depot which will be above the street level, although the material may not be actually used in 18 months. The company is now storing in New Jersey at the rate of 2500 tons a month the material ordered some time since for the work below the street level. It is expected, too, that the New York Central road will at an early date come forward with requirements of somewhere between 15,000 and 20,000 tons for the new terminal station. A good deal of bridge work and of material for large buildings is in sight in different parts of the country.

It is estimated that there have been contracted for thus far about 50,000 tons of foreign Structural Material, which includes some sales of Belgian mills. The bulk, as already announced, has been taken by the German Steel Syndicate. Reports of a concerted movement abroad to advance prices in Beams are not confirmed here.

There have been some further large contracts for rolling stock and the report is current that one of the large systems has been forced to turn to foreign makers for equipment in order to get reasonable delivery.

Comparatively few large sales of Pig Iron are reported. The Steel Corporation has purchased 15,000 tons more for the Pencoyd Works, and in the Chicago market a sale of 12,500 tons of Malleable Bessemer Pig was effected. The market for all grades of Pig Iron is hardening.

Furnacemen have bought heavily of Lake Ores for the next season and some large purchases of foreign Ores have been effected.

In the Wire trade the feeling is growing that there may be an advance before the close of the year.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	Dec. 6, 1905.	Nov. 29, 1905.	Nov. 8, 1905.	Dec. 7, 1904.
PIG IRON:				
Foundry No. 2 Standard, Philadelphia	**$18.25**	$18.25	$18.00	$16.50
Foundry No. 2 Southern, Cincinnati	**16.75**	16.75	16.50	15.75
Foundry No. 2, Local, Chicago	**19.25**	19.50	18.25	16.50
Bessemer, Pittsburgh	**18.35**	18.10	17.85	16.35
Gray Forge, Pittsburgh	**17.10**	16.85	16.35	15.85
Lake Superior Charcoal, Chicago	**20.00**	20.00	18.50	17.50
BILLETS, RAILS, &c.:				
Bessemer Billets, Pittsburgh	26.00	26.00	26.00	21.00
Forging Billets, Pittsburgh	30.00	30.00	30.00	25.00
Open Hearth Billets, Phila.	30.00	30.00	30.00	....
Wire Rods, Pittsburgh	**32.50**	32.00	32.00	31.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
OLD MATERIAL:				
O. Steel Rails, Chicago	**16.50**	16.50	14.75	14.50
O. Steel Rails, Philadelphia	**18.25**	18.25	18.00	16.50
O. Iron Rails, Chicago	23.00	23.00	23.00	22.00
O. Iron Rails, Philadelphia	**24.50**	24.00	24.00	20.50
O. Car Wheels, Chicago	**18.00**	18.00	16.00	16.00
O. Car Wheels, Philadelphia	**17.50**	17.50	17.00	14.50
Heavy Steel Scrap, Pittsburgh	**18.00**	18.00	17.00	16.00
Heavy Steel Scrap, Chicago	15.25	15.25	15.25	14.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	1.83½	1.83½	1.83½	1.53½
Common Iron Bars, Chicago	1.85	1.85	1.85	1.65
Common Iron Bars, Pittsburgh	**1.90**	2.04¾	1.84¾	1.54½
Steel Bars, Tidewater, New York	1.64½	1.64½	1.64½	1.44½
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.30
Tank Plates, Tidewater, New York	1.74½	1.74½	1.74½	1.54½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.40
Beams, Tidewater, New York	1.84½	1.84½	1.84½	1.54½
Beams, Pittsburgh	1.70	1.70	1.70	1.40
Angles, Tidewater, New York	1.84½	1.84½	1.84½	1.54½
Angles, Pittsburgh	1.70	1.70	1.70	1.40
Skelp, Grooved Steel, Pittsburgh	1.55	1.55	1.55	1.40
Skelp, Sheared Steel, Pittsburgh	1.65	1.65	1.65	1.50
SHEETS, NAILS AND WIRE:				
Sheets, No. 27, Pittsburgh	**2.20**	2.20	2.15	2.10
Wire Nails, Pittsburgh	1.80	1.80	1.80	1.70
Cut Nails, Pittsburgh	**1.70**	1.65	1.65	1.70
Barb Wire, Galv., Pittsburgh	2.25	2.25	2.25	2.15
METALS:				
Copper, New York	**18.00**	17.87½	16.50	14.87½
Spelter, St. Louis	**6.40**	6.25	6.00	5.70
Lead, New York	**5.90**	5.75	5.25	4.60
Lead, St. Louis	**5.75**	5.55	5.15	4.52½
Tin, New York	**35.10**	34.25	33.20	29.12½
Antimony, Hallett, New York	**13.00**	12.50	12.50	9.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	**3.59**	3.59	3.49	3.64

Chicago.

FISHER BUILDING, December 6, 1905.—(*By Telegraph*).

While the general demand for Pig Iron and Finished Materials has subsided occasional contracts for large tonnages continue to be placed by large buyers, who either underestimated their requirements or are anxious to cover their wants through the first half of next year. One large foundry interest closed for 12,500 tons of malleable Bessemer during the week and a large Western distributor closed for approximately 25,000 tons of Plates, Shapes and Bars. A reconsideration of the rejected bids for erecting the Northwestern Elevated extension resulted in placing a contract with the American Bridge Company for 7000 tons of material. The Rock Island Railroad placed an order for 1800 cars and the Wabash is negotiating for 5000. Another advance of $1 a ton was made on Light Rails on December 1 and on Monday advances of $2 to $3 a ton on store prices of Steel Bars went into effect. The demand for Light Rails continues unusually heavy and distributors and consumers are covering heavily to cover future requirements. Jobbers' stocks of Steel Bars are low on account of delayed shipments, and this is largely because of the higher prices which are now prevailing. There is an insistent demand for Structural Material from stock and on certain sizes as high as $2.75 is readily obtainable, and shipments continue to be made to distant points both east and west, prices being no longer a factor. Mills continue from four to six months behind on deliveries, and while building operations have been curtailed to some extent the pressure on the mills has not tbeen greatly relieved. With the close of navigation the car shortage has increased, the Illinois Steel Company having been short 450 cars last week, according to reports, while another large Western producer secured 100 less than required during the same period. Fin-

ished Material awaiting shipment is actually congesting the mills, and this delay, coupled with the heavy specifications that they are receiving and which continue to exceed their output from 95 to 100 per cent., accounts for the shortage of material in consumers' hands. Coke shipments to Western furnaces and foundries continue heavy and stocks are rapidly being accumulated. Quotations on Foundry Coke are higher than last week, consignments having been disposed of at prices which netted the producers from $3.25 to $3.35 per ton. The refusal of all Wire Nail interests to make quotations on Nails for spring delivery beyond the 60-day limit indicates the strength of the Wire Nail situation. Last year the trade was permitted to cover through the spring months early in November, which resulted in considerable speculative buying and was generally unsatisfactory to the mills. The general enforcement of the 60-day limit would also indicate that higher prices will soon prevail. The upward movement of prices on Northern and Southern Iron has been temporarily checked, the close of the year and the advent of the holiday season not being favorable to heavy buying, which would advance prices much above their present basis.

Pig Iron.—The sale of 12,500 tons of Malleable Bessemer to a leading Malleable foundry was the largest transaction of the week in the Iron market. The general demand is light and inquiries for Iron for immediate shipment from consumers already covered have fallen off, indicating that the furnaces are keeping up with the specifications. Heavy coke shipments to furnaces in this district promise a maximum output. Northern Foundry, No. 2, is quoted at $19, furnace, equivalent to $19.25 to $19.50, delivered. Southern Iron, which is held by Southern furnaces at $15, Birmingham, for No. 2, is freely offered at 50c. a ton less and the indications are that the upward movement has been temporarily checked. We revise Chicago quotations as follows:

Lake Superior Charcoal	$20.00 to $20.50
Northern Coke Foundry, No. 1	19.75 to 20.00
Northern Coke Foundry, No. 2	19.25 to 19.50
Northern Coke Foundry, No. 3	18.75 to 19.00
Northern Scotch, No. 1	20.00 to 20.50
Ohio Strong Softeners, No. 1	20.05 to 20.30
Ohio Strong Softeners, No. 2	19.55 to 19.80
Southern Coke, No. 1	18.65 to 19.15
Southern Coke, No. 2	18.15 to 18.65
Southern Coke, No. 3	17.65 to 18.15
Southern Coke, No. 4	17.15 to 17.65
Southern Coke, No. 1 Soft	18.65 to 19.15
Southern Coke, No. 2 Soft	18.15 to 18.65
Southern Gray Forge and Mottled	16.65 to 17.15
Malleable Bessemer	19.50 to 20.00
Standard Bessemer	19.30 to 19.55
Southern Basic	18.65 to 19.15
Jackson Co. and Kentucky Silvery, 6 %	18.80
Jackson Co. and Kentucky Silvery, 8 %	20.80
Jackson Co. and Kentucky Silvery, 10 %	22.30

Metals.—There is no halt in the upward movement of Metal prices. Tin has established a new high price record for the last decade and Copper will soon establish a new maximum if present advances continue. Effective December 2, Sheet Zinc was advanced 25c. per 100 lbs., from $7.50 to $7.75, Lacalle, while Lead and Spelter remain stationary. We quote: Casting Copper, 18¾c. to 19c.; Lake, 19c. to 19¼c.; Pig Tin, car lots, 36c. to 36½c.; small lots, 37c.; Spelter, prompt delivery, 6¼c. to 6½c. for car lots; Lead, Desilverized, 5¾c.; Corroding, 6c. for 50-ton lots; on car lots, 2¼c. per 100 lbs. higher; Sheet Zinc is $7.75 list, f.o.b. Lasalle, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, 15¾c.; Heavy Copper, 15¼c.; Copper Bottoms, 14¼c.; Copper Clips, 14¼c.; Red Brass, 14¼c.; Red Brass Borings, 11½c.; Yellow Brass, Heavy, 10½c.; Yellow Brass Borings, 9¼c.; Light Brass, 8c.; Lead Pipe, 4¾c.; Tea Lead, 4¼c.; Zinc, 4.65c.; Pewter, No. 1, 21c.; Block Tin Pipe, 27½c.

Boiler Tubes.—Official discounts, f.o.b. Chicago, base sizes, in car lots, are as follows: Steel Tubes, 62.35; Iron, 51.35; Seamless, 50.35; 2½-inch and smaller and lengths over 18 feet and 2¾-inch lengths over 22 feet, 10 per cent. extra.

(By Mail.)

Billets.—Little new business is being placed, the bulk of the specifications reaching the mills being on contracts placed earlier in the year. Forging Billets for prompt delivery are quoted on the basis of $34 to $35 flat, f.o.b. Chicago.

Rails and Track Supplies.—Another advance of $1 a ton became effective on Light Rails on December 1. Within the last two months prices have been advanced $3 a ton, which is due almost entirely to the belated demand which set in with the fall months. During the summer users of Light Rails bought sparingly, but the continued advances have brought out a large tonnage, both shippers and consumers covering for future requirements. No additional tonnage for Standard Sections has been taken on during the week by the Western mills. Specifications on Spikes, Bolts and Track Supplies continue very heavy. Quotations are revised as follows: Angle Bars, accompanying Rail orders, 1906 delivery, 1.50c.; carload lots, 1.75c.; Spikes, 1.85c. to 1.95c.; Track Bolts, 2.50c. to 2.60c., base, Square Nuts. The store prices on Track Supplies range from 15c. to 20c. above mill prices. Light Rails, 30 lb. to 45 lb. Sections, $27 to $27.50; 25-lb., $28 to $28.50; 20-lb., $29 to $29.50; 16-lb., $30 to $30.50; 12-lb., $31 to $31.50; lighter Sections down to 8-lb., $36 to $40, f.o.b. mill. Standard Sections are quoted $28, f.o.b. mill, full freight to destination.

Plates.—The largest contract closed for Plates in some time was placed this week with the leading Western producer, calling for 8000 tons for future shipment. The general demand, however, continues almost entirely limited to small lots for immediate shipment. While specifications continue very heavy, the mills are in position to make fairly prompt deliveries. Prices are firm but unchanged, as follows: Tank quality, ¼-inch and heavier, wider than 6¼ and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Flange quality, in widths up to 100 inches, 1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-inch and heavier, up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16 inch up to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8 up to 60 inches wide, 2.15c. to 2.25c.; Flange and head quality, 25c. extra.

Bars.—Contrary to expectations, the leading interest has already secured 2c. for Iron Bars, notwithstanding the fact that some of the independent mills are willing to take business on a basis of $2 to $3 a ton below this price. A contract for 8000 tons of Steel Bars this week is the largest order that has reached the mills since the recent heavy buying movement subsided. The general demand is limited almost entirely to small lots for quick shipment. Store prices on Steel Bars have been advanced from $2 to $3 a ton, on account of the inability of jobbers to secure adequate shipments from the mills. We revise quotations as follows: Iron Bars, 1.85c. to 2c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.01½c., extras as per Hoop card; Bands, 1.66½c., as per Steel card; Soft Steel Angles and Shapes, 1.66½c., half extras, and Hard Steel Angles and Bars are now quoted on practically the same basis as Soft Steel. Store prices are as follows: Bar Iron, 2.20c. to 2.25c.; Soft Steel Rounds and Squares, 2 inches and larger, 2c., base; Flats, 2 and 4 inches by 1½ inch and thicker, 2c., base; Flats, 4½ x 5 inches and 6 x 5-16 inch and thicker, 2c.; all Ovals, Half Ovals and Half Rounds, 2c.; Steel Bands are held at a minimum of 1.95c. to 2c., half extras; Soft Steel Hoops, 2.30c., full extras, with 5c. to 10c. higher than the minimum prices named for small quantities from store.

Sheets.—On account of the low prices at which both jobbers and consumers were permitted to close for their future requirements mill specifications are very heavy and it is certain that the entire tonnage closed on the low basis will be taken out. All mills are strictly adhering to the new official list and no concessions have been reported. We quote: Blue Annealed, Nos. 9 and 10, 1.81½c. to 1.86½c.; Blue Annealed, Nos. 18 to 20, 2.16½c. to 2.21½c.; No. 27, 2.36½c. to 2.41½c.; No. 28, 2.46½c. to 2.51½c., with the customary differentials between gauges. Store prices are 2c. to 2.10c. for No. 10 Blue, 2.05c. to 2.15c. for No. 12 Box, 2.10c. to 2.20c. for No. 14, 2.20c. to 2.30c. for No. 16, 2.40c. to 2.50c. for Nos. 18 to 20, 2.45c. to 2.55c. for Nos. 22 and 24, 2.50c. to 2.60c. for No. 26, 2.55c. to 2.65c. for No. 27, 2.65c. to 2.70c. for No. 28 and 3.15c. to 3.35c. for No. 30. Galvanized Sheets, in car lots from mill: Nos. 10 and 11, 2.36½c. to 2.41½c.; Nos. 17 to 21, 2.71½c. to 2.76½c.; No. 27, 3.26½c. to 3.31½c.; No. 28, 3.46½c. to 3.51½c. Galvanized Sheets from store: Nos. 10 to 14, 3c. to 3.10c.; Nos. 16 to 20, 2.90c. to 3c.; Nos. 22 to 24, 3.05c. to 3.15c.; No. 26, 3.25c. to 3.35c.; No. 27, 3.45c. to 3.55c.; No. 28, 3.65c. to 3.75c.

Structural Material.—Local jobbers in Structural Material continue in receipt of orders for assorted sizes from fitters and builders on both the Pacific and Atlantic coasts. As a result of this continued demand prices from warehouse are stronger and on 6, 7, 18, 20 and 24 inch Beams and 5-inch Channels 2.75c. is quoted. All Angles 3 inches and larger are quoted at 2.25c. and Tees 2.30c. The range of prices from warehouse is from 2.25c. to 2.75c. The mills are not catching up on the deliveries very rapidly and shipments on various sections are behind from four to six months. An order for 8000 tons of Shapes of assorted sizes was placed this week with the leading interest. Building permits during the month of November were issued for the erection of 830 buildings, involving a cost of $5,099,600. The total number of permits taken out this year provide for the construction of 7889 buildings, involving a cost of $57,754,870, as compared with $41,570,940 last year, an increase of over $16,000,000. Quotations on mill shipments for future delivery are as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.86½c.; Angles, 3 to 6 inches, ¼ inch and heavier, 1.86½c.; Angles, larger than 6 inches on one or both legs, 1.96½c.; Beams, larger than 15 inches, 1.96½c.; Zees, 3 inches and over, 1.86½c.; Tees, 3 inches and over, 1.91½c.,

in addition to the usual extras for cutting to extra lengths, punching, coping, bending or other shop work.

Merchant Pipe.—The demand has fallen off materially, which is always the case at this season of the year. While low prices continue to rule, concessions from the official list are not often allowed, as the independent manufacturers are unable to make a profit on the present basis. Official discounts are as follows: Black Steel Pipe, 78.35 per cent. on the base sizes, ¾ to 6 inches, and Galvanized, 68.35 per cent. Iron Pipe is quoted from 1½ to 2 points higher. From store in small lots Chicago jobbers are quoting 76½ to 77 per cent. on Black Steel Pipe, ¾ to 6 inches.

Boiler Tubes.—There is practically no change in the situation, the demand continuing light and almost entirely limited to shipments from jobbers' stocks. Official discounts, f.o.b. Chicago, in car lots, are as follows: Steel Tubes, 62.35; Iron, 51.35; Seamless, 50.35. Store prices are unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1¼ inches	40	35	42½
1¾ to 2¼ inches	50	35	35
2½ inches	52½	35	30
2¾ to 3 inches	60	47½	42½
6 inches and larger	50	35	..

Merchant Steel.—Mill shipments continue to be greatly delayed on account of the shortage of cars and stocks at local warehouses have been practically depleted. Very little new business is being placed and specifications are largely on contracts placed some time ago. We quote: Planished or Smooth Finished Tire Steel, 1.70c.; Iron finish up to 1½ x ½ inch, 1.65c., and Iron finish 1½ x ½ inch and larger, 1.50c., base, Pittsburgh, and Channels for solid rubber tire are quoted as follows: ¾, ⅞ and 1 inch, 2c., and 1⅛-inch and larger, 1.90c., Pittsburgh; Smooth Finished Machinery Steel, 1.91½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.86½c.; Cutter Shoe, 2.40c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6½c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting, 50 per cent. discount on car lots and 45 per cent. in less than car lots, in base territory.

Cast Iron Pipe.—The United States Cast Iron Pipe & Foundry Company was this week awarded a contract for 4195 tons of Pipe ranging in sizes from 16 to 24 inches by the city of Portland, Ore. This contract has been under negotiation for some time and the first bids, which were rejected, were received in September. Quotations are unchanged, as follows, f.o.b. Chicago, per net ton: Water Pipe, 4-inch, $31; 6, 8, 10 and 12 inch $30; over 12-inch, $29, with $1 extra for Gas Pipe. Large municipal contracts are usually placed at somewhat lower basis.

Coke.—Practically all of the low priced Coke which was consigned to this market for disposal has been sold and jobbers are now asking on a basis of $3.65 to $3.75, Connellsville, for Foundry Coke. During the past week cars from a heavy consignment made by some of the Connellsville producers were sold on a basis as low as $6 a ton, Chicago. Local consumers are not anxious to close for deliveries extending through the first half of the year, but are willing to cover requirements through the first three or four months, as from past experience Coke prices decline materially in this market as soon as the movement of cars improves. Wise County Foundry Coke continues to be quoted on the basis of $6.25, Chicago.

Old Material.—Consumers generally are limiting their purchases to small lots for prompt shipment, evidently believing that lower prices will prevail after the first of the year. Dealers, on the other hand, anticipate a higher range during the winter months, when they believe the car shortage will be acute and the outcome of Scrap consequently interfered with. They are promptly picking up all the railroad offerings at prices higher than consumers are willing to pay. No railroad lists have been issued so far this month, although it is known that the December lists of several roads promise to be heavier than usual. Quotations are practically unchanged. The range of prices paid by large consumers to producers and dealers, car lots, f.o.b. Chicago, is as follows:

Old Iron Rails	$23.00 to $23.50
Old Steel Rails, 4 feet and over	16.50 to 17.00
Old Steel Rails, less than 4 feet	16.50 to 17.00
Heavy Relaying Rails, subject to inspection	26.50 to 27.00
Old Car Wheels	18.00 to 18.50
Heavy Melting Steel Scrap	15.25 to 15.50
Frogs, Switches and Guards	15.75 to 16.25
Mixed Steel	13.00 to 13.50

The following quotations are per net ton:

Iron Fish Plates	$20.50 to $21.00
Iron Car Axles	23.50 to 24.00
Steel Car Axles	18.00 to 18.50
No. 1 Railroad Wrought	18.00 to 18.50
No. 2 Railroad Wrought	17.00 to 17.50
Locomotive Tires, smooth	14.25 to 14.50
Railway Springs	15.00 to 15.50
No. 1 Dealers' Forge	14.00 to 14.50
Wrought Pipes and Flues	12.50 to 13.00
Mixed Busheling	12.50 to 13.00
Iron Axle Turnings	12.50 to 13.00
Soft Steel Axle Turnings	12.50 to 13.00
Machine Shop Turnings	12.00 to 12.50
Cast Borings	10.00 to 10.50
Mixed Borings, &c	9.75 to 10.00
No. 1 Mill	10.00 to 10.50
Country Sheet	9.00 to 9.25
No. 1 Boilers, cut to Sheets and Rings	12.00 to 12.50
No. 1 Cast Scrap	15.00 to 15.50
Stove Plate and Light Cast Scrap	12.00 to 12.50
Railroad Malleable	15.00 to 15.50
Agricultural Malleable	14.50 to 15.00

Philadelphia.

REAL ESTATE TRUST BUILDING, December 5, 1905.

The market seems to have lost a good deal of its vigor, sales of Pig Iron having dropped off in a very marked degree, although finished products are in as good demand as ever. The change is a perfectly natural one, however, and is probably a good thing for the trade, as it is obviously impossible for heavy buying to keep on for more than three or four months at a time without some kind of a slackening up. The movement during the period named has been the heaviest on record, while the advance in prices has been remarkably small considering the amount of business done. Consumption has also made new records, but as very full provision has been made for the first half of 1906, there is no reason why buying should not fall off for a while. Thirty or 60 days' buying may go several months ahead of consumption, and even though the latter may exceed expectations there is a limit to the capacity for consuming the material. Consequently buying must necessarily be restrained until things can be evened up. The comparative indifference of buyers is therefore no indication of less favorable conditions, and although it is quite likely that the purchase of Pig Iron will be much lighter during the next few weeks, the demand for finished products may increase. Plans for a vast amount of new work are being prepared and orders and specifications for the material should be forthcoming in the near future, so that while there may be a slackening in the demand at one end it is quite likely to be counterbalanced by greater activity elsewhere. Be that as it may, present indications are along the lines named.

Pig Iron.—A rather quiet week must be reported as regards Pig Iron. Compared with the heavy transactions during the preceding two or three months there has been a remarkable falling off, but, as we have already remarked, a period of dullness must necessarily follow such extraordinary activity as was recently experienced. The furnaces will have all they can do to make deliveries as contracted for, however, so that new business need not be very large to maintain the present satisfactory conditions, although sentiment in the Iron trade is extremely fickle. If prices are not advancing it is not long before the trade settles to the conviction that a decline is pending, and when buying becomes less urgent it is at once supposed that business is not as good as it was. It is obvious that when purchases are completed during two or three months to cover consumption requirements for six or eight months to come there must be a considerable wait somewhere along the line. What was sold must be delivered, and what is bought must be consumed, and when purchases have been in excess of the capacity for consuming there must necessarily be an interval during which things can be evened up. This appears to be the situation to-day, and while prices cannot very well advance under such conditions, it is even more certain that they cannot decline, almost everything that can be produced being under contract for forward delivery. Slight changes there may be, and perhaps will be, but as there is some doubt whether deliveries can be made as promptly as desired the chances seem to favor higher rather than lower prices, especially for early deliveries. Quotations are not essentially changed from last week and most of the business has been done at medium figures. Some have accepted the inside rates, others have obtained outside prices, but $18.50 for No. 2 X Foundry and $16.50 for Gray Forge appear to be a fair average. Basic Iron is held at higher figures, but there is not much demand, while, on the other hand, there is very little for sale, so that the situation as regards this class of Iron is very strong. Low Phosphorus is scarce and would command $24.50 to $25 for prompt shipment, sales of small lots having been made at prices named. The general range for Philadelphia and nearby deliveries would be about as follows:

No. 1 X Foundry	$19.00 to $19.25
No. 2 X Foundry	18.25 to 18.75
No. 2 Plain	17.75 to 18.00
No. 2 Southern	18.75 to 19.00
Standard Gray Forge	16.25 to 16.50
Basic	17.75 to 18.00
Low Phosphorus	24.00 to 24.50
Bessemer	19.50 to 19.75
Malleable Iron	18.75 to 19.00

Steel Alloys.—The situation as regards alloys is so unusual that it is quite impossible to give exact quotations. The best that can be done is to give a mere outline of what is being done and quote as nearly as may be possible under the circumstances. Arrivals of Spiegel and Ferromanganese have been somewhat larger during the past two weeks,

amounting to about 3000 tons, which is being distributed *pro rata* among those whose contracts entitle them to it. Lots for spot or December delivery bring extraordinary prices, however, and even for the first half of 1906 prices are very wild and, as we said before, are hardly quotable, although the following are as near the market as can be given:

Silico Spiegel, 10 and 18 per cent	$40
Ferrosilicon, 50 per cent	$97 to 100
Spiegeleisen, 20 per cent	37 to 39
Ferromanganese, 80 per cent., $100 to $125 spot or December, or for first half of 1906 $85 asked and $80 bid.	

Steel.—The demand is very active and prices for ordinary Open Hearth Steel rule at about $30, with the usual differentials on high carbons.

Muck Bars.—There is more interest manifested and some business has been done at $28.50, f.o.b. seller's mill. Higher prices are now asked and it would be difficult to place orders for less than $28.75 to $29 for strictly good Bars.

Plates.—The demand is well maintained and specifications are promptly given. The output of Eastern mills is the largest on record, yet prospects for continued activity are in no respect less favorable than before. Prices unchanged, as follows:

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel	1.73½	1.78½
Flange or Boiler Steel	1.83½	1.88½
Marine, A. B. M. A. and Commercial Fire Box Steel	1.93½	1.98½
Still Bottom Steel	2.03½	2.08½
Locomotive Fire Box Steel	2.23½	2.28½

The above are base prices for ¼-inch and heavier. The following extras apply:

	Per 100
3-16-inch thick	$0.10 pounds extra.
Nos. 7 and 8, B. W. G.	.15 "
No. 9, B. W. G.	.25 "
Plates over 100 to 110 inches	.05 "
Plates over 110 to 115 inches	.10 "
Plates over 115 to 120 inches	.15 "
Plates over 120 to 125 inches	.25 "
Plates over 125 to 130 inches	.50 "
Plates over 130 inches	1.00 "

Structural Material.—In some cases deliveries are a little easier; in others it seems impossible to get the promise of shipments until well into the spring months. Prices officially are 1.83½c. to 2c. Actual figures at which small lots can be had are about two-tenths more money.

Bars.—There is an excellent demand for Bars. As a rule orders can be placed at about 1.83½c. Some mills quote a little more money, but first-class Bars can be had at the figure named. Specifications are given with more than ordinary promptness, so that on the whole the situation is unusually satisfactory. Steel Bars are quoted at 1.63½c., but if anything like good deliveries are required premiums of more or less importance have to be paid.

Sheets.—There is plenty of business around and mills have all they can do to make satisfactory deliveries at about the following prices: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c., and No. 28, 2.80c.

Old Material.—There is not much change in prices, which may be called steady to firm. Offerings are somewhat larger, however, so that the chances for the near future appear to favor the buyer somewhat. Bids and offers for deliveries in buyers' yards are about as follows:

Scrap Steel Rails	$18.25 to $18.50
No. 1 Steel Scrap	17.50 to 18.00
Low Phosphorus Scrap	23.50 to 24.00
Old Steel Axles	21.50 to 22.50
Old Iron Axles	27.50 to 28.00
Old Iron Rails	24.50 to 25.00
Old Car Wheels	17.50 to 18.00
Choice Scrap, R. R. No. 1 Wrought	22.00 to 22.50
No. 1 Yard Scrap	20.00 to 20.50
Long and Short	19.00 to 19.50
Machinery Scrap	16.00 to 16.50
Wrought Iron Pipe	16.50 to 17.00
No. 1 Forge Fire Scrap	16.25 to 16.75
No. 2 Light Ordinary	13.00 to 13.50
Wrought Turnings	14.50 to 15.00
Axle Turnings, Choice Heavy	15.50 to 16.00
Cast Borings	10.50 to 11.00
Stove Plates	13.25 to 13.75
Grate Bars	12.75 to 13.00

The Logan Iron & Steel Company has removed its offices from the Harrison Building to 408-409 North American Building, Broad, below Chestnut street.

Thomas P. Conard has removed from the Forrest Building to 609 and 610 Harrison Building, Fifteenth and Market streets, opposite the Broad Street Station.

Dallett & Co., Iron and Steel, have removed from 201 Walnut place to 611-612 Harrison Building, Philadelphia.

An elaborate report has just been issued on iron nickel manganese carbon alloys by the Alloys Research Committee of the British Institution of Mechanical Engineers, which consists of Dr. H. C. H. Carpenter, R. A. Hadfield and Percy Longmuir.

Cincinnati.

FIFTH AND MAIN STS., December 6, 1905.—(*By Telegraph.*)

Pig Iron.—The week just closing has probably been the most quiet in the way of new business since the beginning of September. As a matter of course a number of small sales have been made, but in no instance have we report of anything involving any considerable tonnage. Conditions appear to be well maintained and the tone is firm. The situation as regards the furnaces is unchanged and shows a large percentage both North and South well sold up into next year. At the same time consumers as a whole are known to be well covered for this period, so that the market is quiet as the result of these two facts. Consumers are said to be taking all shipments promptly, showing thereby that consumption has not decreased. Just how long this state of affairs is destined to continue is a mere matter of conjecture, but the consensus of opinion seems to be that very little can be expected until after the close of the holiday season, when it is anticipated the market will receive a fresh impetus lasting for several months. The local foundry trade is said to be fairly active with the demand for specialties strong. Fourteen dollars, Birmingham, for No. 2 is apparently well established and is the ruling quotation, with one or two furnaces holding for 50c. higher, but with no sales of any consequence at this figure and then only where a special brand is preferred. Northern No. 2 is still on a $17.50 basis, with several furnaces asking $18, but without any apparent results. While there is apparently enough Iron offering to meet all requirements there is not a large surplus, and perhaps will not be unless the number of furnaces are increased, as practically 87 per cent. of all the furnaces in the country are now in full blast and each making its full quota of Iron. Freight rates from Hanging Rock district to Cincinnati are $1.15, and from Birmingham $2.75. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1	$17.25
Southern Coke, No. 2	16.75
Southern Coke, No. 3	16.25
Southern Coke, No. 4	15.75
Southern Coke, No. 1 Soft	17.25
Southern Coke, No. 2 Soft	16.75
Southern Coke, Gray Forge	15.50
Southern Coke, Mottled	15.25
Ohio Silvery, No. 1 (8 % Silicon)	20.15
Lake Superior Coke, No. 1	19.15
Lake Superior Coke, No. 2	18.65
Lake Superior Coke, No. 3	18.15

Car Wheel and Malleable Irons.

Standard Southern Car Wheel	$20.25 to $20.50
Lake Superior Car Wheel and Malleable	19.50 to 19.75

Coke.—Coke from the Connellsville district is moving more freely than for several weeks, due to the pleasant weather and a more generous car supply. In the Virginia fields, however, the situation is said to be as unsettled as ever and shortage of equipment is causing much serious delay and inconvenience. Several large contracts for Furnace Coke are reported to have been closed during the week contemplating deliveries into the first quarter of next year. With the supply increased prices are possibly a shade softer, the best grades of 72-hour Connellsville and Virginia Foundry ranging from $3.75 to $4. Furnace grades are quoted at $2.75 to $3, f.o.b. ovens.

Finished Iron and Steel.—The market is strong and prices are firm, with Plates and Shapes in growing demand. Considerable new structural work is being figured on running far into the next year and the situation is one of continued activity. We quote, f.o.b. Cincinnati: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same in small lots, 1.85c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.83c.; Plates, ¼-inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, ¾ x 3-16 and heavier, 1.83c., in carload lots.

Old Material.—The demand is good and growing stronger. Quite a heavy tonnage has been sold during the week and dealers report the situation very satisfactory. We quote dealers' prices, f.o.b. Cincinnati: No. 1 Railroad Wrought Scrap, $17 to $17.50 per net ton; No. 1 Cast Scrap, $14 to $14.50 per net ton; Iron Rails, $20 to $21 per gross ton; Steel Rails, rolling mill lengths, $15 to $15.50 per gross ton; Relaying Rails, 56-lb. and upward, $24.50 to $25 per gross ton; Iron Axles, $22.50 to $23 per net ton; Car Wheels, $16.50 to $17 per gross ton; Heavy Melting Scrap, $15 to $15.50 per gross ton; Low Phosphorus Scrap, $18.50 to $19 per gross ton.

Willard Wilson has been appointed local agent of the Tennessee Coal, Iron & Railroad Company, with offices in the First National Bank Building, Cincinnati. He was formerly connected with the Tennessee Company at its general offices in Birmingham and is well known to the trade. Matthew Addy & Co. have been the representatives of the Tennessee Company at this point for a number of years, but pursuant to a change in the policy of the com-

pany which goes into effect January 1, whereby the company markets its own product, have severed their connection with the company. A. H. Carpenter, the Coal agent of the company, located here, will be transferred to Chicago, where he will become general sales agent. The rumor had gone forth that the representatives of Matthew Addy & Co. at Chicago, Pittsburgh, Philadelphia and St. Louis were to sever their connections with this firm, but James A. Green, in an interview to-day, denies the reports and states that the business of the firm will continue as heretofore, and that the rumors are without foundation.

Pittsburgh.

PARK BUILDING, December 6, 1905.—(*By Telegraph.*)

Pig Iron.—We quote a fairly active inquiry for Bessemer and Basic Iron, but no large sales have been made since our last report. The Midvale Steel Company is credited with having bought 3000 tons more of Bessemer on the basis of about $17.50 at furnace. We also note a sale of 1000 tons of Bessemer for January delivery at this price. Negotiations are again on with the United States Steel Corporation, which will likely buy a round tonnage of Bessemer for first quarter delivery before this month is out. The price of Bessemer Iron is very firm on the basis of $17.50 at furnace for first quarter delivery, with some sellers asking $18. Basic Iron is not quite as firm in price as Bessemer, and for first quarter delivery has been offered at slightly less than $17.25 at furnace. There is very little inquiry for Foundry Iron, most large consumers being well covered. A local interest will likely close to-day for about 1000 tons of Southern Foundry for delivery at its works outside the Pittsburgh district. We quote Northern No. 2 at $17.15 to $17.50, Valley furnace, equal to $18 and $18.35, Pittsburgh. Some furnaces that are well sold up refuse to shade $17.50 at furnace. There is some inquiry for Forge Iron and we note a sale of 1500 tons for second quarter at $16.25 at furnace, equal to $17.10, Pittsburgh.

Steel.—The market continues very firm and the mills are still much behind on deliveries of Billets and Sheet and Tin Bars. We Quote Bessemer and Open Hearth Billets at $26 to $27 and Sheet and Tin Bars in random lengths at $27, maker's mill.

Ore.—Lake navigation has practically closed, the last boat having been loaded on Monday. Independent Ore interests have sold in the past week upward of 800,000 tons of Ore on the basis of about $3.50 for non-Bessemer Mesaba Ore running 52.8 per cent. in natural Iron. Mesaba Bessemers have been bringing very close to $4 at the mines and it is claimed there is very little Bessemer Ore to be had.

(*By Mail.*)

The month of December, which is usually quiet in the Iron trade, promises to be no exception this year, taking the first week of the month as a criterion. While the situation is quiet in such lines as Pig Iron, Steel, Scrap and Coke, the volume of tonnage in Finished Iron and Steel is fairly heavy and the mills are still months behind in deliveries. The Pig Iron market has been especially quiet within the past week, but may become more active toward the latter part of the month, at which time it is expected that the United States Steel Corporation may come in and buy for first quarter. Indications are that it will want from 40,000 to 50,000 tons each for January, February and March, but it is claimed that the available tonnage of Bessemer Iron for those months is less than 75,000 tons. Bessemer and Basic Iron continue firm on the basis of $17.50, Valley furnace, with some small lots offering at about 25c. a ton less. There is a fair inquiry for Steel, with considerable delay on the part of the mills in making deliveries on Billets, Sheet and Tin Bars. Specifications on contracts for finished material keep pouring into the mills, while new tonnage is also fairly large. In the Wire trade the demand is unusually heavy for this season of the year and the mills have a heavy tonnage on their books. The same is true of Structural Material, the leading interest being reported booked up for about ten months ahead. An advance in prices of Wire products prior to January 1 is generally anticipated.

Ferromanganese.—There is no abatement in the scarcity of Ferro and fancy prices continue to be paid by consumers for small lots to help out until the regular supply arrives. As noted last week, as high as $125 a ton is reported to have been paid for carload lots of Ferro for spot shipment. Conditions in Russia are such that Ferro is likely to continue very scarce for some time to come.

Steel Rails.—Orders for Rails continue to pour into the mills. Rail buying has never been as active in the history of the trade as it has been in the past two or three months. It is stated that the mills have booked very close to 1,700,000 tons for delivery next year and many of the prominent roads have not yet placed their requirements. Orders in the past week or ten days aggregate fully 100,000 tons, both Eastern and Western roads buying heavily. We note an active demand for Light Rails also, on which prices are very firm and as follows: 8-lb., $36 to $37; 10-lb., $32 to $33; 12-lb., $29 to $30; 16-lb., $27 to $28; 25-lb. to 45-lb., $26 to $26.50, all f.o.b. cars, maker's mill. We understand that some mills are quoting Light Rails at about $1 a ton higher than above prices.

Rods.—We note a fairly active inquiry for Rods, which are very firm, due to the high prices and scarcity of Steel. The American Steel & Wire Company and Pittsburgh Steel Company have been out of the market as active sellers of Rods for some time. We quote Bessemer and Open Hearth Rods at $32.50 to $33 and Open Hearth Chain Rods, $33, maker's mill.

Skelp.—The heavy tonnage in Pipe is reflected in Skelp, which is in heavy demand and on which the mills are somewhat behind in deliveries. Prices continue very strong and we quote: Grooved Steel Skelp, 1.55c. to 1.60c.; Sheared, 1.65c. to 1.70c.; Grooved Iron Skelp, 1.65c. to 1.70c., and Sheared, 1.75c. to 1.80c. These prices are for ordinary widths and are f.o.b. maker's mill.

Plates.—New tonnage in Plates has fallen off to some extent. This is rather welcomed by the mills, as it will give them a chance to catch up in deliveries, on which most of the leading mills are still some months behind. It is generally expected that an advance of $2 a ton on Plates, or to the basis of 1.70c., may be made before this month is out. We quote: Tank Plates, ¼ inch thick, 6¼ up to 100 inches in width, 1.60c., base, at mills, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edge	$0.10
Gauges Nos. 7 and 8	.15
Gauge No. 9	.25
Plates over 100 to 110 inches	.05
Plates over 110 to 115 inches	.10
Plates over 115 to 120 inches	.15
Plates over 120 to 125 inches	.25
Plates over 125 to 130 inches	.50
Plates over 130 inches	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)	.10
Complete Circles	.20
Boiler and Flange Steel Plates	.10
Marine, "A. B. M. A.," and ordinary Fire Box Steel Plates	.20
Still Bottom Steel	.30
Locomotive Fire Box Steel	.50

Shell Grade of Steel is abandoned.

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ⅛ of 1 per cent. is allowable. Pacific Coast base, 1.40c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Structural Material.—Orders continue to pour in and the American Bridge Company is credited with having taken upward of 65,000 tons of new business last month. It is stated that this company has orders on its books aggregating about 500,000 tons, or practically ten months' work. The Queen & Crescent is in the market for 2500 tons of Bridge work, which may be doubled. The Union National and Commonwealth Real Estate buildings, the largest local jobs in sight, are expected to be given out before January 1. They will require upward of 15,000 tons. The mills are still some months behind in deliveries, especially on Open Hearth Material. Premiums continue to be paid for small lots for prompt shipment. We quote: Beams and Channels, up to 15-inch, 1.70c.; over 15-inch, 1.80c.; Angles, 3 x 2 x ¼ inch thick up to 6 x 6 inches, 1.70c.; 8 x 8 and 7 x 3½ inches, 1.80c.; Zees, 3-inch and larger, 1.70c.; Tees, 3-inch and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—A fair amount of new tonnage is being placed, based on the recent advance in prices, and the mills are quite full of work, with good prospects ahead. The margin between prices of Sheets and Sheet Bars is still relatively small and some of the outside mills are not actively seeking business at present prices, claiming there is very little profit in it. We quote: Black Sheets, Box Annealed, one pass through cold rolls, 10 to 12 gauge, 1.90c.; Nos. 13 and 14, 1.95c.; Nos. 15 and 16, 2c.; Nos. 17 to 21, 2.05c.; Nos. 22 to 24, 2.10c.; Nos. 25 and 26, 2.15c.; No. 27, 2.20c.; No. 28, 2.30c.; No. 29, 2.45c., and No. 30 gauge, 2.55c. We quote Galvanized Sheets as follows: Nos 10 and 11, 2.25c.; Nos. 12 to 14, 2.35c.; Nos. 15 and 16, 2.45c.; Nos. 17 to 21, 2.60c.; Nos. 22 to 24, 2.75c.; Nos. 25 and 26, 2.95c.; No. 27, 3.15c.; No. 28, 3.35c.; No. 29, 3.60c., and No. 30, 3.85c. We quote No. 28 gauge Painted Roofing Sheets at $1.65 per square and Galvanized Roofing Sheets, No. 28 gauge, at $2.90 per square for 2½-inch corrugations. Job-

bers charge the usual advances over above prices for small lots for store.

Iron and Steel Bars.—A fair amount of new tonnage is being placed in Iron Bars, but in Steel Bars new business continues heavy and the mills are still some months behind in deliveries. The Republic Iron & Steel Company is quoting Iron Bars at 2c. in carloads and 2.10c. in less than carloads, f.o.b. Youngstown, to which 4¾c. freight should be added for Pittsburgh delivery. However, some of the Eastern and also some of the Western mills are shading this price and are selling Iron Bars in this market on the basis of about 1.90c., Pittsburgh. Should an advance in Plates be made this month it is almost certain that Steel Bars will be advanced to the basis of about 1.60c. We quote Steel Bars at 1.50c., base, half extras, for carloads and larger lots.

Hoops and Bands.—Specifications on contracts on Hoops made some time age for delivery prior to July 1, 1906, are coming in very freely, but only a fair amount of new business is being placed at the recent advance in prices. We quote Steel Hoops at 1.85c. and Bands to be used for cooperage purposes at 1.85c., the latter carrying full Hoop and Band extras. Bands for other than cooperage purposes are 1.50c., base, half extras, as per Standard Steel card. Above prices are for carload lots, f.o.b. Pittsburgh, plus full tariff rail rate to point of delivery.

Tin Plate.—As noted last week, the demand is much heavier than usual at this season of the year and a good deal of new tonnage is being booked. Prices are firm and we are advised that the mills are adhering strictly to the price of $3.40 per base box. If the present scarcity and high price of Tin Bars continue, and they give every promise of doing so, it is not unlikely there may be another advance in Tin Plate before long. We quote Tin Plate at $3.40 per base box, f.o.b. Pittsburgh, for 14 x 20 100lb. Cokes, terms 30 days, less 2 per cent. off for cash in 10 days. Some mills allow a rebate of 5c. a box on the above price to the large trade.

Merchant Steel.—On the larger sizes of Rounds, Flats and Squares the mills are many months behind in deliveries and do not seem to be catching up to any extent. In fact, the leading interests are pretty well covered on all they make for the next three or four months or longer. Prices are firm and we quote: Smooth Finished Tire, 1.70c.; Toe Calk Steel, 2c. to 2.05c.; Railway Spring Steel, 1.65c. to 1.70c.; Cutter Shoes, 2.20c. to 2.25c.; Flat Sleigh Shoe, 1.50c. to 1.55c.; Crucible Tool Steel, 6c. to 8c. for ordinary grades and 12c. and upward for special grades. The demand for Shafting is quite heavy, which we quote at 50 per cent. discount in carloads and 45 per cent. in less than carloads, delivered in base territory.

Railroad Spikes.—The demand continues very heavy and the mills are from two to three months behind in deliveries. Another advance in prices may possibly be made before the first of the year. We quote Railroad Spikes at $2 to $2.10 per 100 lbs., f.o.b. maker's mill, and note that some makers are holding at the higher price.

Spelter.—The demand continues exceptionally heavy and there has been another sharp advance in prices. We now quote Prime Western grades of Spelter at 6.20c. to 6.25c., St. Louis, equal to 6.32½c. and 6.37½c., Pittsburgh.

Merchant Pipe.—It is the old story in Merchant Pipe, the demand being very heavy and the leading mills filled up for several months. The heavy tonnage and the high prices in Plates undoubtedly warrant higher figures for Pipe, but there are no indications of any betterment in prices. While the discount to jobbers is 80 off the list, this is not the extreme of the market, which is at least one point lower to the larger trade. It is practically certain that some mills that have to buy Skelp are marketing their Pipe to-day at actual cost or below it. Discounts are as follows:

Merchant Pipe.

	Jobbers, carloads.				Consumers, carloads.			
	Steel.		Iron.		Steel.		Iron.	
	Blk.	Galv.	Blk.	Galv.	Blk.	Galv.	Blk.	Galv.
	%	%	%	%	%	%	%	%
⅛ and ¼ inch	72	56	69½	53½	71	55	68½	52½
⅜ and ½ inch	76	64	73½	61½	75	63	72½	60½
⅝ to 6 inches	80	70	78	68	79	69	77	67
7 to 12 inches	75	60	73	57½	74	59	72	56½
Extra strong, plain ends:								
⅛ to ⅜ inch	65	53	62½	50½	64	52	61½	49½
½ to 4 inches	72	60	69½	57½	71	59	68½	56½
4½ to 8 inches	68	56	65½	53½	67	55	64½	52½
Double extra strong, plain ends:								
½ to 8 inches	61	50	58½	47½	60	49	57½	46½

Boiler Tubes.—This is the off season of the year in Boiler Tubes and the amount of new tonnage being placed is light. However, the mills are pretty well filled up on contracts, on which buyers are specifying freely. There is some unevenness in prices of Tubes, the discounts given below no longer representing minimum of the market, but are shaded more or less, depending on specifications and tonnage in the order. Discounts are as follows:

Boiler Tubes.

	Iron.	Steel.
1 to 1½ inches	41	44
1¾ to 2¼ inches	41	56
2½ inches	46	58
2¾ to 5 inches	53	64
6 to 13 inches	41	56

Iron and Steel Scrap.—As a natural result of the heavy sales of Scrap in the early part of November, and the fact that consumers are pretty well covered and do not care to take on additional material for December delivery, the Scrap market has quieted down to some extent and prices are somewhat softer. The large consumers of Scrap are covered for some little time ahead and the balance of this month will likely be quiet. Dealers quote about as follows: Heavy Melting Scrap, $18 to $18.50; No. 1 Wrought Scrap, $20 to $20.50; Cast Iron Borings, $11 to $11.25; Bundled Sheet Scrap, $15.50 to $15.75; Old Steel Rails, short pieces, $18 to $18.50; long pieces, for which there is a good demand at present, are held at $18.50 to $19; Machinery Cast Scrap, $16; Cast Steel Scrap, $18; Malleable Iron Scrap, $16 to $16.25; Old Iron Rails, $25 to $25.50; Old Iron Axles, $28 to $28.50; Old Car Wheels, $18.50 to $19; Steel Turnings, $14.25 to $14.50, all in gross tons, f.o.b. Pittsburgh. Sales are reported as follows: 2000 tons of Heavy Melting Scrap, $18.25; 1000 tons Steel Turnings, $14.50; 2000 tons No. 1 Wrought Scrap, $20; 1500 tons Cast Iron Borings, $11.25; 700 tons of Busheling Scrap, $18, and 400 tons of Steel Axles at $23.50, all in gross tons, f.o.b. Pittsburgh.

Coke.—The softening of prices of Coke, to which we referred last week, still continues, with the chances that prices may decline still further. The operators are being furnished a full supply of cars, which are being moved very freely, while practically every oven in the Connellsville region that can be operated is in blast, the result being a much larger output than has ever been made before. Most of the furnaces are covered with contracts and buying is mostly for reasonably prompt shipment. We quote strictly Connellsville Furnace Coke at $2.90 a ton at oven, but on a firm offer this might be slightly shaded. Prices on 72-hour Foundry Coke are very firm, but most consumers are covered by contracts. Furnace Coke made outside the Connellsville region is lower in price than for some months and can readily be bought at $2.40 a ton, and perhaps lower. The Upper and Lower Connellsville regions made last week about 365,000 tons of Coke. The total output of both regions for this year is expected to considerably exceed 16,000,000 tons, which is a record breaker.

Birmingham.

BIRMINGHAM, ALA., December 3, 1905.

Pig Iron.—The Pig Iron situation has changed very little since last week. The market remains firm at $14.50 for No. 2 Foundry, with a goodly number of small inquiries and sales reported, but no deals for any large tonnage have been made. The holiday the past week possibly retarded sales to some extent, but it is very evident that the majority of consumers have covered for their requirements for the first quarter and many of them for the second quarter of next year. The present lull is therefore one that might naturally be expected at this time. Shipments are going forward as rapidly as the scarcity of cars will permit, but lack of cars is retarding the movement to a considerable extent. The railroad people claim they have ample cars in the district to move all the business, but on account of the shortage of labor the cars are not being unloaded as promptly as they should. The labor problem is becoming appalling here and unless something is speedily done to remedy it the present production cannot be kept up. Several stacks are now ready to go in blast, but cannot do so until the labor situation improves. Although several thousand men have been brought into the district within the past few months many of the manufacturing plants here are still working only about half force.

The American Cast Iron Pipe & Foundry Company is making good progress in the erection of its plant and expects to be in operation by April 1. It will begin booking orders within the next 30 days.

It is understood that the Weller Rolling Mill Company, whose plant was recently destroyed by fire at Anniston, will remove to Gadsden and begin the erection of a $100,000 works at an early date.

The Tennessee Coal, Iron & Railroad Company reports the following appointments as managers of sales, effective January 1, 1906: New York, E. B. Blandy, Hanover Bank Building, No. 5 Nassau street; Chicago, A. H. Carpenter, The Rookery; Cincinnati, Willard Wilson, First National Bank Building; St. Louis, not definitely decided upon, but the office will be in the Missouri Trust Building. Frank A. Burr, the general sales agent, will retain his office at Birmingham for the present, the above managers reporting to him.

Cleveland.

CLEVELAND, OHIO, December 5, 1905.

Iron Ore.—Buying for 1906 delivery has been heavy. The possibility is indicated that the enormous shipments of this season will not curtail the buying from the Lake Superior district for the ensuing year. It is too early as yet to make any definite estimate of the amount of Ore to be left on dock at the opening of navigation next year. Until there is some indication of what those figures will be buying may be somewhat restricted. The sales that are now made are on about the following basis: Bessemer Old Range, $4.25; Bessemer Mesaba, $4; non-Bessemer Old Range, $3.75, and non-Bessemer Mesaba, $3.50, all f.o.b. boats at Lake Erie ports. These prices are for standard analysis, the prices varying with the difference in the grades of Ore produced. The lake shipping season is about at an end. The insurance on lake vessels expires to-morrow at midnight and all boats loading for this year must be out of port by that time to get their insurance. The indications are that the total lake shipment from the head of the lakes has exceeded 33,000,000 tons.

Pig Iron.—The demand for Foundry Iron has not eased nor has there been any increase in the supply. The result is an extreme shortage for prompt shipment, with prices strong. One of the serious elements governing the situation in this territory is the tendency of all buyers to demand Iron faster than the original stipulations. Most consumers prefer to get additional material on their old contracts than to go into the market and buy at present figures or to hunt around until they can find the quality of Iron desired. The furnaces having sold more than the usual amounts on contract, and having sold their spot Iron, are not in position to meet the extra demands coming from so many quarters. The situation is embarrassing. Many buyers are now forced to go into the outside markets, principally in the South, to get what material they need at once. The best that can be done now is $18 in the Valleys for No. 2, although sellers could obtain better figures if they had the Iron. Southern furnaces are asking $14.50, Birmingham, for No. 2, to which is added $3.85 to make up the Cleveland price. Steel making Irons are about steady. There is a good demand for Basic. Some sales have been made for spot shipment at $18 in the Valleys. In both Foundry and Steel making Irons there is a waiting tendency at present as to future sales. The Coke market is steady. The supply is limited somewhat by the car shortage. Prices have not changed, holding at $4 at the oven for 72-hour Foundry for spot shipment and $3.90 for first-half contracts. Furnace Coke is selling at $3 to $3.25.

Finished Iron and Steel.—The brokers who bought a supply of Billets a short time ago are now reaping a harvest in this territory. About the sole reliance of some consumers is upon this supply. Most of the mills are entirely out of the market for several weeks to come. In some instances Bessemer 4 x 4's have sold as high as $30 to $31 at the mill, while Forging Billets have been known to sell as high as $35 at the mill. These prices are somewhat extreme and, of course, apply only to small lots. The demand for Light Rails is also strong and the supply limited. Buyers have been forced to pay $30 for 16-lb. Rails at the mill and have not been able to get many Rails at that figure. The other sizes are on about the same basis. The announcement was made the latter part of last week that two more vessels have been contracted for on the lakes. Other reports have it that eight more are to be placed before the end of the year. These orders in the aggregate will call for about 40,000 tons of Structural Steel and Plates. Aside from this there is a steady demand for Shapes from all quarters, the smaller sizes being especially scarce. Most of the sales in this territory are still made from stock, where prices range from 2.50c. for the larger sizes to 3c. for the smaller sizes. There is a good call for Plates, also with the supply short, although premiums are not yet reported. Some of the mills are in position to make fairly prompt shipments. The price holds at 1.60c., Pittsburgh. In Bars there is a notable shortage. Many consumers have difficulty in getting their orders filled and in some instances the smaller mills have been asking a $2 premium for quick shipment. In all lines specifications against old contracts are unusually heavy. Bar Iron is still strong, with many mills sold up far ahead. The price holds at 1.80c., Youngstown, for quick shipment, and 1.75c., Youngstown, for future delivery if the contract runs through the first half of the year. Sheets are holding about steady. This is not the busy season, hence the present strength is a little unusual. The prices out of stock have not changed, being based on the following: For No. 10 Blue Annealed, 2.05c.; for No. 28 One Pass Cold Rolled, 2.65c., and for No. 28 Galvanized, 3.65c.

Old Material.—Buying has been strong during the week, showing an improvement over recent conditions. The mills have begun to cover their needs sparingly and prices have strengthened. The following are dealers' quotations to the trade, gross tons: Old Steel Rails, $16.50 to $17.50; Old Iron Rails, $23 to $24; Iron Car Axles, $16.50 to $17.50; Heavy Melting Steel, $16.50 to $17.50. Net tons: Cast Borings, $9.50 to $10; No. 1 Busheling, $15 to $15.50; No. 1 Railroad Wrought, $16.50 to $17.50; Iron Car Axles (nominal), $22 to $23; No. 1 Cast, $14 to $15; Stove Plate, $11; Iron and Steel Turnings and Drillings, $11 to $12.

New York.

NEW YORK, December 6, 1905.

Pig Iron.—Under the surface there has been quite a good deal of buying, particularly for prompt delivery. The market is firm. The Steel Corporation has rounded out its purchases for Pencoyd to about 40,000 tons. We quote: Northern Iron, No. 1 Foundry, $19 to $19.25; No. 2 Foundry, $18.50 to $18.75, and No. 2 Plain, $18 to $18.25, tidewater. Southern Iron is selling on the basis of $18 to $18.50, tidewater.

Steel Rails.—An order for 60,000 tons to apply on the Chicago, Milwaukee & St. Paul extension from Evarts, S. D., to Tacoma and Seattle. The Baltimore & Ohio has placed with Pennsylvania mills a portion of its requirements, which are expected to reach a total of about 75,000 tons. The Chesapeake & Ohio has given out some additional business and among inquiries pending is one for between 20,000 and 25,000 tons.

Structural Material.—The pressure of specifications on existing contracts continues without abatement, and the amount of new railroad business now being figured on gives promise of a continuance of the present strain through the winter months. Strikes in the New York building trades are not felt back at the mills, and in such a time of widespread building operations as the present are not likely to make an impression on rolling schedules. As an example of the way in which mills and fitting shops have a certain independence of immediate construction operations, the American Bridge Company has been delivering Steel for some months at the rate of about 2500 tons a month for the substructure of the new Pennsylvania depot in New York City. It is all going into storage yards, the work not being ready for the Steel. And this week the railroad company has asked bids on 22,000 tons more for the same structure, all to be used on the portion of the work above the street level. This month the New York Central will call for bids for 15,000 to 20,000 tons of Steel for its new terminal station. New building projects locally are not in evidence, but throughout the country there is quite a little figuring on buildings, industrial and commercial. One inquiry for Steel in the week was for 400 to 500 tons to go into a California sugar factory. We quote prices on tidewater delivery, mill shipments, as follows: Beams, Channels, Angles and Zees, 1.84½c.; Tees, 1.89½c.; Bulb Angles and Deck Beams, 1.99½c. Beams, 18 to 24 inches, 0.10c. extra; Angles over 6 inches, 0.10c. extra. Sales out of stock, cut to length, are made at from 2.50c. to 3c. The German Steel Syndicate continues to quote £5 10s., c.i.f. New York, on Beams and Channels and can make fairly prompt deliveries. The report of an advance in prices on German material, to take effect this week, is not officially confirmed. Some consumers of Steel Piling have been making inquiry with a view to getting a foreign supply. It is estimated that 50,000 tons of Structural Steel has been imported since September, including some business placed with Belgian mills direct.

Plates.—The Eastern mills are receiving heavy specifications on contracts and their capacity is so well filled that longer time is now required on deliveries on new orders. Shipments cannot be made under two weeks and in most instances more time is required. Among recent orders booked were about 7000 tons from shipbuilding interests. Quotations at tidewater for shipment from mills are as follows: Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 1.94½c. to 2.04½c.; Fire Box Plates, 2.04½c. to 2.60c., according to specifications.

Bars.—Mill agents report a continued good trade in Bar Iron, with higher prices asked for deliveries after January 1 than for shipment during the current month. Quotations are continued at 1.84½c. to 1.89½c., tidewater, for Bar Iron, and 1.64½c. to 1.84½c., tidewater, for Steel Bars. The inside quotation for Steel Bars applies, of course, to contracts for delivery three or four months hence. An advance has been made in Tire Steel, which is sold according to Bar list extras, many mills giving simply an additional cold rolling after the Bar mill, without any special passes for rounding at edges. The advance varies in different sizes, according to extras. On Rubber Channel Tire 1⅛ inch and larger an advance has been made from 1.70c. to 1.90c., Pittsburgh. Under 1⅛ inch the advance is from 1.80c. to 2c., Pittsburgh.

Cast Iron Pipe.—The authorities of New York City have not yet come to a decision with regard to the bids on 30,000 tons, which were opened November 22. A contractor secured the Pipe work for this city, which will require 1300 tons of small sizes, on which bids were opened last Wednesday, and it is quite likely that the order for the Pipe will

go to an Eastern independent company. Manufacturers report a very active demand from gas companies. The outlook continues fully as favorable as at any previous time. Carload lots continue to be quoted at **$28.75 per net ton** for 6-inch at tidewater.

Old Material.—The Steel Scrap situation is strong. A lot of 3000 tons has been sold at a somewhat higher price than $18, eastern Pennsylvania. Inquiries are in the market from two or three local consumers aggregating 15,000 tons. Cast Scrap is even stronger than last week, with quite an active demand. A sale of 1000 tons of Heavy Cast has been made at full prices. Car Wheels are likewise in active demand and are bringing fully 25 cents per ton more than last week. Hammered Iron Car Axles are somewhat higher, some 2000 tons having been disposed of within the week at $29, delivered at works in eastern Pennsylvania. Another good sized quantity was sold in the Pittsburgh district at about the same price. Borings and Turnings are in fair demand at a slightly better price than that ruling last week. Wrought Pipe is very strong at old prices. Railroad Wrought Scrap is a little easier in eastern Pennsylvania. Quite a number of consumers are out of the market and claim to be buying at 25c. per ton less than last month. The tonnage of rolling mill material in this city has been greatly reduced in quantity, as heavy shipments were made to buyers in November. With practically no accumulation it is expected that prices will be well maintained until buyers are again compelled to come into the market. Quotations are approximately as follows for New York and vicinity, per gross ton:

Old Iron Rails	$22.50 to $23.00
Relaying Rails	25.00 to 26.00
Old Steel Rails, rerolling lengths	16.50 to 17.50
Old Steel Rails, short pieces	16.50 to 17.00
Heavy Melting Steel Scrap	16.50 to 17.00
Standard Hammered Iron Car Axles	27.00 to 28.00
Old Steel Car Axles	21.00 to 22.00
No. 1 Railroad Wrought	21.50 to 22.00
Iron Track Scrap	18.50 to 19.25
No. 1 Yard Wrought, long	19.50 to 20.50
No. 1 Yard Wrought, short	17.50 to 18.50
Wrought Pipe	15.25 to 15.50
Light Iron	11.50 to 12.00
Cast Borings	9.25 to 9.50
Wrought Turnings	13.00 to 13.50
Old Car Wheels	18.00 to 18.50
No. 1 Machinery Cast	15.00 to 15.25
Stove Plate	12.00 to 13.00
Malleable Cast	15.50 to 16.50

The Block-Pollak Iron Company, Cincinnati, has opened an office at room 1335, Broad Exchange Building, 25 Broad street, New York, in charge of Herbert L. Schamberg.

Wallace Buell and W. H. Mitchell have opened offices at 120-122 Liberty street, New York, rooms 303, 304, under the firm name of Buell & Mitchell, to conduct a general business in Raw and Finished Iron and Steel products. A special feature of their business will be melting materials of foreign and domestic manufacture for Steel works consumption.

Metal Market.

NEW YORK, December 6, 1905.

Pig Tin.—The principal feature of the week was the statistics issued December 1, which were very favorable from the standpoint of the holders of the metal. This stimulated an advance, which has continued during the week. The reports, as compiled by C. Mayer of the New York Metal Exchange, are given as follows:

Deliveries into consumption during November were large, amounting to 3600 tons. The total for the 11 months of this year shows an increase of 3200 tons, compared with the same period of last year.

The combined deliveries of London and Holland for November were 380 tons larger than last year. For the 11 months the decrease in deliveries amounts to 1070 tons, compared with the same period of last year.

The total visible supply statistics for Europe and the United States show:

	Tons.
November 30, 1905	13,174
October 31, 1905	12,812
November 30, 1904	14,412
December 31, 1904	14,768

The buying of the week has been on a small scale, but prices are very firm. On November 29 Tin was sold at 34.20c., on December 1 at 34.70c. and on the 4th and 5th at 35c., although prices ranging ⅛c. higher were demanded for small lots and special brands. To-day's New York price is again higher at 35.10c. In London the price to-day is higher at £160 15s. for spot and £157 17s. 6d. for futures. This is the highest price for this movement as well as the highest price on that Exchange since the days of the famous French syndicate in 1888. On December 1 the sale of Banca Tin took plcae at Rotterdam, consisting of about 1550 tons, and went at the high price of 96⅛ florins, equal to about 35.25c. per lb., c.i.f. New York. The arrivals in America so far this month aggregate 550 tons and there are afloat for American ports 1970 tons.

Copper.—The price continues firm at approximately 18c. Buying is very restricted and consists principally of small lots for immediate consumption. This price is also quoted for delivery during the first quarter of 1906. Various reports are current regarding sales of metal at a considerable premium. These represented urgent needs on the part of buyers who are compelled to satisfy their immediate wants. The larger trade is apparently trying to satisfy its regular customers with as much metal as can be spared at the price named above. The statistics of Copper, as compiled by C. Mayer of the New York Metal Exchange, show that the total exports since January 1, 1905, exclusive of Southern and Pacific ports, for November, aggregate 220,892 tons as against exports during the corresponding period of 1904 of 227,888 tons. The imports of Copper for the first ten months of this year aggregate 77,550 tons, as against 66,350 tons during the corresponding period in 1904. The exports so far this month have been of a fair volume, aggregating 3716 tons. In London the market has declined slowly during the week, to-day's price being £77 17s. 6d. for spot and £77 2s. 6d. for futures. Trading on the London Exchange has also been considerably restricted. The Chinese melters are reported to have canceled some of their orders for immediate shipment and bought Copper for later delivery.

Spelter.—The market has been firm throughout the week and prices are higher. The price in New York is now on a basis of 6.40c. to 6.50c. In St. Louis the market is decidedly stronger, with small offerings at 6.45c., and 6.35c. bid. In London the market is practically unchanged at £28 12s. 6d. Ore advanced $2 per ton during the week.

Pig Lead.—Premiums continue to be offered for spot shipments. The price has advanced and to-day the market closes firm at 5.90c. In St. Louis the price is also much firmer at 5.75c. Some importations have been made both from Europe and Mexico, but these have had practically no effect on the market. In London the market is decidedly higher at £17. The American Smelting & Refining Company has advanced quotations 0.10c. and is now quoting 5.35c. for shipment Lead in 50-ton lots, but orders continue to be taken only on the basis of price current on date of shipment.

Antimony.—The market is firmer, Cookson's ruling at 13c. to 13.50c., Hallett's at 12.75c. to 13c., other brands at 12.25c. to 12.75c.

Nickel.—The stock in the hands of the principal producer continues ample for current needs, and the price remains on the old basis of 40c. to 45c. for large lots and 50c. to 55c. for smaller quantities.

Quicksilver.—In San Francisco, flasks of 75 pounds for domestic orders are held at $39. Jobbing lots of 100 flasks of 75 pounds are held in New York on a basis of $40. In London Rothschild's price is unchanged at £7 5s.

Tin Plate.—Several additional mills have started up during the past fortnight and specifications on contracts are coming in rather more freely. The old price of $3.59, f.o.b. New York, and $3.40, f.o.b. Pittsburgh, continues in force. In Swansea, Welsh Plates are firm at 12s. 9d.

Old Metals.—The larger dealers in Old Metals have had no difficulty in disposing of their stocks of Heavy as well as Light Copper. Considerable difficulty is being experienced on the part of smaller dealers in securing Scrap and in many cases their yards are practically bare. Old Lead has felt the influence of the rising market and has advanced 0.10c. There is a good demand for Brass Scrap from founders who are unwilling to purchase new metal at the existing prices. The sellers in this market are holding to about the following basis:

	Cents.
Copper, Heavy Cut and Crucible	17.00 to 17.50
Copper, Heavy and Wire	16.75 to 17.25
Copper, Light and Bottoms	15.00 to 15.50
Brass, Heavy	11.25 to 11.75
Brass, Light	9.25 to 9.75
Clean Brass Turnings	10.00 to 10.50
Composition Turnings	13.00 to 13.50
Heavy Machinery Composition	15.00 to 15.50
Lead, Heavy	5.30 to 5.40
Lead, Tea	5.00 to 5.15
Zinc Scrap	4.75 to 5.00
Aluminum Scrap	20.00 to 25.00

Iron and Industrial Stocks.

NEW YORK, December 6, 1905.

It is expected that an announcement will be made at an early date which will give official information with regard to the movement in Southern iron stocks. It is believed that control of the Tennessee Company has passed, but the proposed merger affects only two companies and does not embrace any other Southern iron properties.

The stock market has held up wonderfully, in view of the uncertain condition of financial matters in Europe and the high interest rates on money in this country. Cast Iron Pipe common made a new high record on Tuesday, reaching 46½. On the same day the preferred stock sold at 94¾. An interesting feature of the week was the crossing of United States Steel preferred by Republic preferred, which occurred on Friday. The latter made a new high record of 105½ on Tuesday. The highest price of United States Steel preferred

on the same day was 104½. On Friday Republic common sold up to 34½. Tennessee Coal fluctuated during the week from 118⅛ to 126½. The car equipment stocks have been strong, Car & Foundry common ranging from 39½ to 42¼, Pressed Steel common from 51¼ to 55⅛, Railway Spring common from 60¾ to 62¾ and Locomotive common from 70¾ to 73. The other industrial stocks were firm, with narrow fluctuations. Last quotations up to 1.30 p.m. to-day were made at the following prices: Can common 9¼, preferred 71¼; Car & Foundry common 41¾, preferred 101½; Locomotive common 71⅞, preferred 117⅞; Steel Foundries common 12½, preferred 46½; Colorado Fuel 47⅞; Pressed Steel common 57½, preferred 100¾; Railway Spring common 62; Republic common 34, preferred 105; Sloss-Sheffield common 92¾; Tennessee Coal 129⅝; Cast Iron Pipe common 46¾, preferred 95; United States Steel common 37½, preferred 104⅝.

At a special meeting of the stockholders of the General Electric Company, held at Schenectady, N. Y., December 5, it was decided to increase the capital stock of the company by the amount of $11,674,500, consisting of 116,745 shares of a par value of $100. This will increase the capital stock from $48,325,500 to $60,000,000.

Dividends.—American Can Company has declared the regular quarterly dividend of 1¼ per cent. on its preferred stock, payable January 1.

Ashton Valve Company has declared an extra dividend of 1 per cent., payable December 15.

New York Pig Iron Warrant Market.

There were a few sales in the New York pig iron warrant market at the Produce Exchange during the week ending at noon Wednesday, the total transactions amounting to but 800 tons. There were no certificate sales. The trades were made as follows: 300 tons of December regular, $17.30; 200 tons same, $17.20; 100 tons same, $17; 100 tons June foundry, $17.25; 100 tons February foundry, $17.30. Some of the brokers said that they made outside sales to consumers during the week. The following prices were established on call Wednesday noon:

	Regular.		Foundry.	
	Bid.	Asked.	Bid.	Asked.
Cash	....	$17.50	$16.90	$17.50
December	....	17.50	16.90	17.50
January	$17.00	17.50	17.00	17.50
February	17.00	17.75	17.20	17.50
March	17.00	....	17.25	17.45
April	17.00	17.50	17.25	17.50
May	....	17.65	17.25	17.50
June	....	17.65	17.25	17.50

The annual fuel cost of power developed in various ways is estimated in a paper read before the Canadian Society of Civil Engineers as follows: For a gasoline engine, $78; for a modern gas engine using illuminating gas, $46.80; for a steam engine, $37.44; for a gas engine using semi-water gas from anthracite coal, $7.80; for one using gas from coke, $5.74, and for one using water and producer gas from bituminous coal, $5 per horse-power year. The above figures were based on these assumptions —a year, 312 days of ten hours each; oil required by gasoline engine ⅛ gallon per brake horse-power hour at 20 cents per gallon; illuminating gas required by gas engine, 15 cubic feet per brake horse-power hour at $1 per 1000 cubic feet; coal required by small high pressure steam engines, 6 pounds per horse-power hour at $4 per ton; anthracite semi-water gas required by gas engine, 1 pound per horse-power hour at $5 per ton; coke semi-water gas required by a gas engine, 0.92 pound per horse-power hour at $4 per ton; water gas required in plants of 500 horse-power or over, 0.8 pound per horse-power hour at $4 per ton.

The number of war ships in the world has been decreasing since 1900, due to the fact that the number of old ships which have been condemned, sold or sunk has exceeded each year but one the number of new ones built. In 1899, excluding torpedo craft, there were 1309 ships. In 1900 the number was 1340; in 1901, 1292; in 1902, 1294; in 1903, 1272; in 1904, 1224; in 1905, 984. The action of the British Government in disposing last spring of about 140 old ships accounts in part for the very rapid drop which the figures have taken this year. The average size of ship has increased, but the drop in numbers has resulted in placing the total displacement in 1905 lower than any since 1901. Thus: 1899, 5,083,000 tons; 1900, 5,536,000; 1901, 5,294,000; 1902, 5,710,000; 1903, 6,010,000; 1904, 6,132,000, and 1905, 5,647,000 tons. The figures for 1905 show the Anglo-Saxons in possession of 304 ships, aggregating 2,516,000 tons; Franco-Russian alliance, 195 ships, 1,149,000 tons; Dreibund, 201 ships, 1,061,000 tons.

One of the developments of the past week in the strike of New York union housesmiths against Post & McCord was an attempt to wreck the derricks at the American Can Company building which Post & McCord are erecting. Guy ropes of three derricks were cut, but only one fell. Several cases of assaults by strikers upon nonunion men were reported in the week. The employers' association, which is backing Post & McCord, has men at work on three buildings and will start nonunion forces at two others. President Ryan of the International Association of Bridge and Structural Workers says that no new strikes will be started until the employers find men for the score of buildings now involved in the Post & McCord strike.

C. E. Lenhart and J. H. Hillman & Son of Pittsburgh, Pa., have bought the plant of the Century Coke Company near Brownsville for $507,000 and will soon let contracts for the building of 200 more coke ovens. The property contains 350 acres of coal lands and has 30 coke ovens now in operation. New buildings will be erected and equipment in the way of boilers and machinery will be needed. J. H. Hillman & Son, Frick Building, Pittsburgh, will be exclusive agents for sale of the coke. It is stated that the development of this property will mean the development of the last piece of drift self draining coal left in the Connellsville region.

A new model field gun just adopted for the Austrian army has the remarkable rate of fire of 21 shots per minute. The bore of the gun is 3 inches and the barrel 90 inches long. The tube is of forged bronze, with a breech closure of the wedge type. The gun is mounted on a long recoil carriage provided with light shields of chrome steel. The shrapnel used has a length of 10.6 inches and contains 320 balls. Fired at a muzzle velocity of 1706 feet per second a maximum range of 6900 yards is attained (about four miles.) The gun is served by six men.

Recently negotiations were in progress between the American Steel & Wire Company and the National Steel & Wire Company for the purchase by the former of the National Wire Corporation and the National Steel Foundry Company, which are constituent parts of the National Steel & Wire Company. Prominent officers of the American Steel & Wire Company made a careful inspection of the plants of the National Steel & Wire Company and the National Steel Foundry Company at New Haven, but the negotiations have now been dropped.

The Bethlehem Steel Company has begun the rebuilding of its blast furnace plant of four stacks. It has not yet been determined that a new rolling mill will be built, but it is understood that Charles M. Schwab and Arch. Johnson have examined the Grey structural mill at Differdingen, Luxemburg, and are considering the question of building a beam mill of this type.

The Westinghouse Company, East Pittsburgh, Pa., contemplates making some extensive additions to its plant, definite plans for which have not yet been made but will be taken up by the Board of Directors very shortly.

The American Pig Iron Storage Warrant Company had on hand November 30, 1905, 63,900 tons of pig iron, the amount received in November being 2600 tons and the amount delivered in the month 10,200 tons. The net decrease in the month was thus 7600 tons.

The Lackawanna Steel Company, Buffalo, N. Y., started its new 40-inch blooming mill last week. Its capacity is 25,000 tons a month, which will be finished in the structural mills of the plant.

The Machinery Trade.

NEW YORK, December 6, 1905.

The general trend of business in the machinery trade during the week past has been toward gathering the ragged edges of orders and beginning the work of closing up the year's business. The number of inquiries was unusual and most of those who asked for bids on machinery gave a varied assortment of requirements, denoting that many factory owners have begun to hurry their year's machinery requirements with a view to closing out the year's purchases; consequently many New York machinery houses had to deal with a wide assortment of orders, and while there was nothing especially big in the way of new business the volume of orders and inquiries gave promise that the year will be rounded out with a rush of good business.

The November trade in heavy power machinery was especially good, one firm selling 52,000 horse-power of boilers. Most of the business then done was in a large way, but inquiries for heavy machinery have been light during the week, which probably indicates that most of the large buying of the year has been completed, although this is not entirely applicable to the boiler trade.

National Machine Tool Builders' Special Meeting.

The trade will be deeply interested in the report of the meeting of the National Machine Tool Builders' Association in New York this week which appears in another column. There will be considerable disappointment in the fact that the project of arranging for exclusive territorial rights between manufacturer and dealer cannot be carried out under the vote of the association because it is included in the joint report of the committee of the association and the Machinery Committee of the National Supply and Machinery Dealers' Association, which has been laid on the table, from which there seems to be little chance that it will be taken. But, on the other hand, the action of the various sections of the association in advancing prices in some instances and in the promise of advancing prices in others will be of much interest. The advance made by the manufacturers of lathes and radial drills will only be sufficient to cover the additional cost of labor, and it is likely that other types of tools which have not already advanced will receive about the same increase as that on radials and lathes. The next two weeks should see announceenmts of the action of several of the sections which have not already voted on the question. The milling machine section had already made its advance and the planer section had only to vote that those members who had not already advanced should follow the lead of those who had, and the latter are in the majority.

Although the joint meeting of representatives of the American Supply and Machinery Manufacturers' Association, National Supply and Machinery Dealers' Association and the Southern Supply and Machinery Dealers' Association, held last week at Cincinnati, did not result in a decision on the part of conferees to hold a joint meeting of their associations this year, there is no doubt that the convention established closer relations between the organizations, and it is believed that another year a joint meeting will be held by the three organizations instead of three separate sessions. The dinner given by Samuel L. Moyer of the Lunkenheimer Company, Cincinnati, Ohio, at the close of the session did much toward cementing the good feeling established at the meeting, and while no definite conclusions were reached as to what will be done another year the general sentiment was to the effect that another year will witness a meeting of the three bodies. As we stated last week, the National Supply and Machinery Dealers' Association decided to meet in February at a place not designated as yet and the Southern Supply and Machinery Dealers' Association will convene at St. Louis March 14. The attendance of the manufacturers at both of these meetings will go far toward furthering the movement to hold a joint session, as the majority of the representatives of the Manufacturers' Association were warmly in favor of a general meeting.

The Cincinnati Planer Company, Cincinnati, Ohio, is sending out new price-lists, advancing prices on all its different sizes of planers from 5 to 10 per cent., with an average of at least 7 per cent. on the entire line.

Important Machinery Requirements.

The new shops of the Delaware, Lackawanna & Western Railroad at Kingsland, N. J., are so nearly completed that it is expected that active work will be begun in several buildings at least within a few weeks. The plant will be one of the largest of the company's system, and, in addition to the section repairing and other machine shop work, it is understood some car building will be done and considerable work which has heretofore been done at various shops on the section will in the future be executed at Kingsland. The main building, which will be known as the paint and coach shop, is about completed, while the other structures will soon be under roof. The main structure is to be 170 feet wide and 660 feet long, with an L on one end 50 x 268 feet. The building will be fully equipped for the construction and repairing of passenger coaches. There is a mill building, 70 x 264 feet, which will be completely equipped with wood working machinery. The structure will be electrically operated and will contain an up to date shavings and sawdust exhaust system. The structure has an addition 50 x 75 feet, which is to be equipped as a dry kiln, while the paint and coach shop has an annex 70 x 300 feet, to be equipped as a cabinet shop, upholstering room and varnish shop. Another extension to the main structure will be fitted out as a plating and embossing room. The power station is 62 x 181 feet, and it is being fitted out with 1400 horse-power of Stirling water tube boilers and four 300 and one 200 kw. generating sets. The machine shop, which has not been begun as yet, is to be 126 x 606 feet. The specifications for mechanical equipment were formulated by R. F. Kilpatrick, superintendent of motive power, who has his headquarters at Scranton, Pa., and G. F. Wilson, whose headquarters are at 26 Exchange place, New York, is purchasing agent of the company. The main building will have an electric traveling crane, which will run the entire length of a truck shop, located at one end of the structure. An electric transfer table 70 x 700 feet will be located between the main building and machine shop and is now being installed. Plans have been completed also for a two-story office building 60 x 100 feet, while coke and cold storage bins and other minor structures will complete the plant. While it is understood that some of the machinery equipment for the plant has been purchased, it is said in the trade that the requirements for Kingsland have by no means been completed and it is highly probable that before long the purchasing department of the railroad will get out another list. It is understood that the paint and coach shop, at least, will be put into active service within a few weeks, and by that time the plant, with the exception of the machine shop, will have been completed, so far as the buildings are concerned.

The present week notes a dearth of inquiries in the line of tools and machinery by the Pennsylvania Railroad Company through its purchasing department. This is very unusual, as there has scarcely been a week of late during which there has not been a demand for the immediate purchase of a machine or tool of some kind. As a matter of fact, the two preceding weeks showed a very respectable demand upon the part of this company for shop equipment, and this, it should be understood, is wholly apart from the regular tool and machinery programme.

It is stated that the Duluth & Iron Range Railroad Company intends to expend this winter about $500,000 in extensions to its machine and repair shops and electric light plant at Two Harbors, Minn.

Milliken Bros., Incorporated, 11 Broadway, New York, placed a number of orders during the week for machinery equipment for their proposed steel plant on New York harbor, and it is said that the majority of the large orders have been settled upon. The company is now receiving bids on its smaller machinery requirements, and this work, it is thought, will be continued for a couple of weeks at least. The larger part of the business placed by the company was given to New York houses, and when it is taken into consideration that several million dollars will be spent for machinery it can be seen that a number of those who received orders have done business enough to make their year's receipts highly satisfactory. The company is hurrying its plans for the plant, and it is said that the work of erecting the buildings, which will be done by the Milliken Bros. Corporation, will be begun before long.

The British Columbia Wire & Nail Company, Limited, Vancouver, B. C., whose plant was recently destroyed by fire, is rebuilding on the old site, which has a water front of 150 feet. The plant and machinery at the time of the fire were worth about $90,000. Owing to the almost total destruction of the plant, the machine shop in particular, the company will have to replace as soon as possible the lathes, shapers, forge, power hack saw, drills, grinders and all the smaller tools. Aside from the machinery proper the company requires new hangers, belting, pulleys, for the main factory building. The nail machines are being overhauled and it has not yet been determined how many will have to be replaced with new ones. Motors of about 125 horse-power for operating the machinery and a boiler for heating the acid were used.

The Niles Boiler Company, Niles, Ohio, which will increase its capital from $100,000 to $150,000, advises us that the additional capital will be used largely for betterment of the plant and the purchase of new tools. The company will install a large number of iron working tools and is now in communication with manufacturers of such tools.

Within a short time the Wire & Telephone Company of America, Rome, N. Y., expects to buy the necessary machinery for equipping its new works. Most of the machinery will be special and has already been arranged for, but the company will be in the market for a small amount of machine shop equipment, such as drills, lathes, milling machines, &c. The company last summer took over the plants of the Empire Wire Company and the Electric Wire Works of Rome and is materially increasing the capacity.

Quite a little new machinery will soon be purchased by the Riverside Engine Company, recently organized at Oil City, Pa. The company is to build an extension 16 x 180 feet and will require a number of new machines, including planers, lathes, large boring mill, horizontal spindle drilling, milling and boring machine, motors, several traveling cranes, radial drills, &c. The company manufactures large gas engines, air and natural gas compressors.

The Oswego Boiler Works, Oswego, N. Y., has been purchased by New York parties associated with the A. D. Granger Company, machinery dealer, 95 Liberty street, New York, with branches at Philadelphia and Pittsburgh. The boiler works, which occupies about 20 acres on the lake front and was established some 12 years ago, has been idle for some time, but the work of preparing it for operation is now under way and it is expected that it will be active again within 60 days. Steel plate work in all branches, including boilers, tanks and stacks, will be manufactured. While the plant is in fairly good condition and consists of a power house, foundry, storage house, machine shop and main building, it is thought that some equipment will have to be purchased by the new owners and that part of the work will be gone on with as rapidly as possible. The new company is known as the Oswego Boiler & Engine Company and its main offices are to be at Oswego.

The Prentiss Tool & Supply Company, New York, has purchased the equipment of the plant of the Gasomobile Company at Marion, N. J., which it is offering for sale.

The Stirling Consolidated Boiler Company, New York, has been awarded the contract by the New York State Steel Company to furnish ten boilers, aggregating 4000 horsepower, for the new plant to be built at Buffalo. The boilers will be fed by chain gate stokers. The company has also been given contracts by Ford, Bacon & Davis for 9000 horsepower of boilers for plants at Birmingham, Knoxville, Nashville and Memphis. The Los Angeles Edison Company has awarded the Stirling Company a contract for 5000 horsepower of boilers arranged with superheaters of 200 degrees.

Bids are being received by the Bureau of Public Works, Buffalo, N. Y., for a 30-ton electric traveling crane for the water works pumping station.

The Furukawa Mining Company, one of the largest mining interests in Japan, has recently contracted with the Japanese engineering and contracting firm of Takata & Co., Tokio, Japan, for the first large turbine pumps ever sent to that Country. These pumps are to be used by the Furukawa Mining Company in pumping out its flooded mines and consist of the following: Four 8-inch three-stage horizontal Worthington turbine pumps, with a capacity of 150 cubic feet of water per minute against a head of 220 feet, and arranged with coupling for direct connection to a Westinghouse 500-volt direct current 150 horse-power motor; four 4-inch three-stage horizontal Worthington turbine pumps, each having a capacity of 50 cubic feet of water per minute against a total head of 220 feet, to be arranged with coupling for direct connection to a Westinghouse 35 horse-power, 500-volt direct current motor. In addition the pumps are to be fitted with trucks with platform for supporting the motors, rheostats and pumps, so as to enable the pumps to be transported to various parts of the mines. The order for the pumps was placed with Henry R. Worthington, and for the motors and rheostats with the Westinghouse Electric & Mfg. Company, through Takata & Co.'s New York office, 10 Wall street.

Business Changes.

Frank A. Thayer has been appointed New York sales manager for the Stirling Consolidated Boiler Company, with offices in the Trinity Building, 111 Broadway. His former offices at 42 Broadway have been abandoned.

Chicago Machinery Market.

CHICAGO, ILL., December 5, 1905.

Local machinery dealers have already received notices of advances on planers and lathes from several Eastern manufacturers acting individually, and these early announcements are taken as foreshadowing a general advance as a result of the meeting of machine tool builders held this week. The demand for punches and shears continues exceedingly heavy and stocks of local dealers have been so heavily drawn upon that they are now practically depleted. Implement and vehicle manufacturers have been the heaviest buyers this fall, and while no large orders have figured in the total business closed the general buying of individual tools has been very heavy. During the past two years manufacturers of punches and shears in the West have greatly added to their capacity, but despite this increased output are operating their plants night and day to meet requirements. Manufacturers of drill presses in the West continue to receive heavy orders for foreign shipments, while the domestic demand is greater than ever before in the history of the trade and plants are running night and day to give satisfactory deliveries. There is no improvement in conditions noted a week ago in the demand for machine tools from store. The buying is liberal enough, but is by no means on so large a scale as during the months of September and October, which made new records for local dealers.

Contracts for some heavy tools have been awarded during the week by the Chicago & Northwestern Railroad at a cost approximating $15,000. The list included wheel turning and axle lathes, boring mills and radial drills, and the Marshall & Huschart Machinery Company, Manning, Maxwell & Moore and Niles-Bement-Pond Company were awarded contracts for the bulk of the equipment.

The O. L. Packard Machinery Company, South Canal and West Washington streets, Chicago, has received an order from the Larsen-Baker Ice Machine Company for machine tool equipment costing $9000. A large contract was also recently closed with the Inventor's Mfg. Company, Kalamazoo, Mich., for a miscellaneous lot of tools.

The Atchison, Topeka & Santa Fé Railroad, Chicago, has issued a small list covering a wide range of tools. It is probable that the purchases will be made before the first of the year.

Joseph T. Ryerson & Son, Chicago, recently booked the following orders for Ferguson flue welding machines: Louisville & Nashville Railroad, two machines; John O'Brien Boiler Works, St. Louis, one machine; Illinois Central Railroad, Burnside shops, two machines. The company reports a big demand for punches and shears and all kinds of tools required in boiler and structural shops.

The Hinde & Dauch Paper Company, Sandusky, Ohio, is erecting a five-story building, 34 x 80 feet, and will in the spring add two stories to its present three-story building, which is 80 x 166 feet. The company expects to add a gas engine and generator. Just how much additional machinery equipment will be needed has not yet been determined.

The Washburn Company, Minneapolis, Minn., has leased the Menzel & Jeffrey foundry at Tenth avenue and Third street and will convert it into a steel casting plant with a capacity of 6000 tons a year. One furnace will be installed. The old foundry will be entirely remodeled with modern machinery throughout. The officers of the company are: Hon. W. D. Washburn, president; John S. Pillsbury, vice-president; Edwin C. Washburn, general manager; C. C. Crane, secretary and treasurer; C. S. Dame, assistant manager; C. H. Burrows, superintendent.

The Sullivan Machinery Company, Chicago, has just received an order from the Bedford Quarries Company, Bedford, Ind., for ten new channeling machines, and from the Walsh sandstone quarries, near Cleveland, Ohio, for eight machines of the same kind. Both of these properties are owned by John R. Walsh of Chicago. A contract was also closed with the Consolidated Stone Company for four channeling machines. The machines cost from $2200 to $2500 each. These orders were all placed through George D. Hunter, Bloomington, Ill., the company's representative in that district.

Philadelphia Machinery Market.

PHILADELPHIA, PA., December 5, 1905.

Orders for machinery and tools continue to be received by both manufacturers and dealers in good volume. In some lines there has been a gain over the amount of business transacted during the previous week and the trade generally is well satisfied with the present condition of business. The inability to deliver tools with any degree of promptness is the only difficulty which is affecting the trade at this time. Owing to the volume of business already taken manufacturers find it almost impossible to turn out tools as rapidly as purchasers desire. In some lines and sizes deliveries cannot be made inside of periods varying from six weeks to six months, and this under normal conditions in the delivery of raw materials. The local manufacturers have been further handicapped recently by the inability to get deliveries on gray iron castings owing to labor troubles in the foundries, which have reduced the productive capacity of those plants to a considerable extent.

The demand during the past week, while not being large in individual orders, has covered the general line of tools and machinery fairly well. Lathes, however, seem to be in particularly good demand and orders for quite a number have been taken. The general tendency appears to be in the direction of the medium sized tools of the different types rather than the heavier or lighter classes. In some instances dealers' floors are beginning to take on a broken appearance, tools having in many cases been sold directly from the floors, and there is considerable delay in obtaining new ones from manufacturers to take their place.

Considerable interest is manifested as to the result of the meeting of the machine tool manufacturers in New York the present week. Information has been advanced that prices of tools will be increased and in some cases it is expected that the advances will be quite large. It has also been said that the advance will in some instances be made effective immediately.

The foreign demand has improved slightly, but only in spots. Both manufacturers and merchants note an increased demand in some lines, but on the whole this branch of the trade is rather inactive.

Boilers and engines of the heavier types are in fairly good demand and some good sales have been made. Those, however, of the smaller powers are not being taken as promptly as manufacturers or dealers would like. Second-hand machinery has been in good demand, due no doubt to the inability of prospective purchasers of new tools to obtain deliveries with any degree of promptness.

Castings, both steel and gray iron, are being ordered in good quantity. Steel casting plants have as much work on their books as they can take care of, while gray iron foundries are handicapped by labor difficulties. With one exception, however, the "struck" foundries have been able to continue in operation, and while it has been impossible to turn out anything like their usual tonnage, fairly good progress has been made and the situation, it is said, is constantly iproving.

The Duplex Metal Company, Chester, Pa., is transforming the old plant of the Combination Iron & Steel Company for the purpose of rolling specialties in steel and copper. J. F. Monnot is president, William C. Hawkins vice-president and B. E. Eldred secretary and treasurer of the company, whose specialty has been the manufacture of Monnot metals.

The John B. Stetson Company will build a large silk factory and hall on Cadwallader street, above Montgomery avenue. It will measure 100 x 200 feet and be constructed of steel frame with reinforced concrete arches. The plans and specifications are by the company's engineer.

The Zephyr Mfg. Company, manufacturer of the Philadelphia radial lamp holder, has appointed Vallee Brothers, 816 Arch street, Philadelphia, exclusive agent for the sale of these lamp holders for the entire State of Pennsylvania, central and southern New Jersey, Delaware and Maryland. The company reports a very good demand for lamp holders, particularly for attachment to machine tools, and is now engaged in fitting, among other plants, that of the Standard Roller Bearing Company of this city with a complete installation.

The American Pulley Company has appointed John Chambers & Son, Auckland, New Zealand, its representative in that country. The company reports a satisfactory condition of business. Orders for export have been well maintained and a large shipment of pulleys has been recently made to its New Zealand agents as well as to parties in Australia, England and Europe. The domestic demand continues active and shipments are constantly being made to many different points in this country.

The Philadelphia & Western Railway, a new suburban electric line, has decided upon the use of the third rail system to operate its lines. An order for 25 high power cars has been placed with a Western manufacturer. These cars are to be equipped with 75 horse-power motors and be geared for high speed service. Considerable headway has been made in laying out the line, but construction work is not expected to be actively pushed until spring. It is probable that the cars of this company may be run over the elevated system of the Philadelphia Rapid Transit Company when this is completed.

The Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., is supplying a large part of the machinery for the new 250-ton mixer for the Republic Iron & Steel Company at Youngstown, Ohio. The above company is extremely busy in all departments and reports the receipt of orders for one 50-inch, four 40-inch, four 26-inch, six 18-inch and one 14-inch Wagner Cold Saws during the past two weeks.

The Baldwin Locomotive Works has again exceeded its former high record for production. During the month of November it turned out 228 complete locomotives, being three in excess of the shipments for October. The Baldwin Works has taken orders recently for 75 locomotives for the 'Frisco lines (including the Chicago & Eastern Illinois Railroad), covering numerous types of engines. An order for 15 freight and five passenger engines has been received from the Lehigh Valley Railroad, while numerous orders for smaller numbers have also been received. The company now has enough work on hand to keep it actively engaged for many months.

The Energy Elevator Company notes a continued good demand for elevators. Out of town business has been active and orders have been taken to install two freight lifts in the Harrisburg Hospital, Harrisburg, Pa. A large power freight lift will be installed in a Chester, Pa., fiber plant, while wagon elevators will be supplied parties in Lima, Ohio, and Parnasess, Pa. Six dumbwaiters are also to be shipped for export to parties in Brussels, Belgium. An electric freight elevator is to be furnished the Fidelity Trust Company for its new building at Fifteenth and Ranstead streets, and another freight elevator installed in the Equitable Warehouse, both in this city. Hand power elevators have also been recently furnished to parties in Oberlin, Ohio; Scioto, Ill.; Springfield, Mass.; Soda Springs, Idaho, and Bridgewater, Va.

The Tabor Mfg. Company notes an exceptionally good demand for its line of foundry molding machines. Sales during the past month have exceeded the corresponding period last year by over 50 per cent., and the present outlook indicates a largely increased business. Orders taken recently include among others three 24-inch hinged roll over machines, with straight draft, for Pennsylvania parties. Two 18 x 26 power ramming split pattern machines will be furnished parties in the Middle West, while a 13 x 18 power ramming split pattern machine of a new type with a 12-cylinder has been ordered by a New York foundry. A 22 x 22 inch split pattern power ramming machine has been sold for export to England, while 7, 12 and 16 inch power ramming machines have been ordered by various parties; 14 x 16, 13 x 20, 12 x 16 and 30 x 30 inch machines have also been purchased by different customers. This company also notes a large demand for Taylor-Newbold saws, sales and deliveries of saws ranging from 20 to 60 inch diameter having been made.

The Newton Machine Tool Works has taken on a large amount of new business during the past month and is busy in all departments. Orders have been well distributed among its various lines and include among others one for three heavy vertical and horizontal slab milling machines of improved design, motor driven, with geared drive and feed; a 20-inch slotting machine and a No. 4 combination cold saw cutting off machine for the Pittsburgh plant of the American Locomotive Company. Orders for a large number of cold saw machines have also been booked, including two No. 1 steel foundry saws, three No. 2 combination machines, and two No. 2 bar cutting off machines. A No. 3 combination cold saw and rotary planing machine is to be furnished to Louisville parties, while a No. 3 crank saw cutting off machine with two blades is to be supplied the Philadelphia & Reading Railroad for its Reading shops. Orders for a number of milling machines of various types have been received, as has also an order for a 33-inch stroke, rack and gear driven slotting machine, with motor drive and reverse through a pneumatic clutch. This company has also shipped a large number of tools during the past month, including a 50-inch rotary planer for a Virginia bridge company, a double vertical chord boring machine for a Pittsburgh bridge company, a 36-inch rotary planer with circular subbase for a Chicago bridge company, and a 42-inch rotary planer with circular base for an Eastern bridge company. Bar and combination cold saw machines have been shipped in good numbers, deliveries being made to parties in various sections of the country, as have also slotting machines of various sizes.

Cincinnati Machinery Market.

CINCINNATI, OHIO, December 4, 1905.

The near approach of the holiday season has as yet had no apparent effect on trade conditions, and from what we can gather machine tools builders generally will be kept as busy during this period as at any time during the past year. The year just closing has in several respects been a phenomenal one, especially along the line of uninterrupted activity. Spring, summer, autumn or winter has each contributed its share of new business and in such proportions that it would be a difficult proposition to draw comparisons and say which was the most desirable season of the four. During the early months of the year a foreign demand began to make itself felt, and from a comparatively small beginning has grown to such large proportions that to-day it is probably the most potent factor in the general trade situation. During the summer came the Japanese seeking large consignments of all classes and kinds of tools, prices being a secondary consideration, the only proviso being that shipments must be immediate. As a result of this builders of tools were enabled to dispose of an unlimited quantity of stock which, coming as it did, was of incalculable benefit and profit. This depletion of stock necessarily demanded extra exertions in again replenishing stockrooms, with the result that many concerns were compelled to labor night and day to accomplish the task and at the same time be in a position to take advantage of future contingencies of a similar nature. After the first or second decided movement along this line a gentle flow of trade resulted with Japan which throughout the year has kept the even tenor of its way, with now and then a spasmodic tendency that has been very satisfactory. Builders of tools have also anticipated a renewed trade with Russia, as it was thought that this country would soon seek to rekindle its idle industries and add to its commercial greatness by expansion along all mechanical lines. To a limited extent this has possibly been true, but internal strife has thus far put a quietus on such a movement and trade is far from satisfactory. We are advised of orders for tools that have been received for points in Russia on which stop orders have been placed until conditions at home were more settled.

During the year the Southern parts of our own country

have shown a decided awakening and builders of saw mills, cane mills, sugar mills and kindred machinery have found a growing demand for their products coming from this section. Cuba, Mexico and South America are also becoming fruitful sources of revenue and trade with these countries is considerably in excess of what it was a year since.

The meeting of the special committees of the National Machine Tool Builders' Association called for th's week is said to have an important bearing on trade generally, and while we are unable to learn the exact import of the situation it is safe to say that several matters recognized as serious problems in the machinery world will be discussed at length by builders of tools whose reputations are national. As usual Cincinnati is sending its representative machine tool men and it is sincerely hoped that much good will result from the meeting.

As foretold in these columns several weeks since, Cincinnati has at last secured a steel castings plant, which is financed by local capital. The company was incorporated for $100,000 at Columbus December 2 by Franklin Alter, William Lodge, J. F. Ellison, M. M. Robertson, Robert Wuest and Harry L. Manss, all well-known men of financial standing. The demand for just such a plant has long been recognized and the Industrial Bureau, through its secretary, W. L. Finch, has been untiring in its efforts to secure outside concerns of this kind to locate here, but without result. Mr. Lodge has personally interested himself in the matter and as a result has succeeded in securing the money required. There has been considerable delay occasioned by the inability to secure a location that was considered ideal in all respects, and at this writing nothing definite has been decided upon, although it is thought that a location will be sought that will be within easy access of the machine tool district in the northern part of the city. A new plant will be erected, thoroughly equipped with the latest and most improve machinery, all of which will have to be purchased, as the enterprise is absolutely new in all its details. This will consist of furnaces, power plant, electric cranes and a full line of machine tools. The buildings and equipment were designed by the Schlieper Engineering & Construction Company, Pittsburgh. The main building will be about 130 x 260 feet, constructed of steel. Employment will be given to about 300 men, with a capacity of from 350 to 400 tons per month. C. G. Robinson, formerly connected with the American Steel Foundries, will be general manager, with William Lodge president. Complete organization will be effected this week. The company expects to be ready for operations by the middle of April.

The Dreses Machine Tool Company reports business very good. Last week it received a large order for about 12 radial drills and a number of heavy boring and facing machines from the Philadelphia & Reading Railroad Company through Manning, Maxwell & Moore. Quite a large order for tools came from a point in Russia, but shipments have since been ordered postponed until the present turmoil is over. The demand for screw and turret machinery is on the increase and the year has been very satisfactory.

The Cincinnati Machine Tool Company reports general trade well established and things moving along in easy channels. Foreign inquiry is stronger than it was several weeks since and considerable trade is the result. Several tools have been added to its equipment recently which are giving general satisfaction.

New England Machinery Market.

WORCESTER, MASS., December 5, 1905.

Conditions have changed but little during the past week. A few instances are reported of orders received from customers who wish to get in before the National Machine Tool Builders' Association advanced its prices, anticipating the action at the special meeting in New York yesterday and to-day. There has been a tendency on the part of some dealers to stock up at prevailing prices during the past few months, but this has not been encouraged by the manufacturers. In fact, for some time past deliveries have been in such shape that in standard lines the dealers have had all they could do to satisfy the demands of their customers, and where orders have been given with the intention of increasing stock on hand they have usually contained the provision that they will be subject to changes in prices.

Machine tool builders report that there is a very material gain in foreign business, agents abroad being unusually heavy buyers, and in addition orders from foreign governments aggregate considerable amounts.

George H. Berg, Boston, Eastern manager of the Allis-Chalmers Company, has been elected president of the Manufacturers' Association, Boston, and L. H. Norton, Magee Furnace Company, was added to the Executive Committee. Among the directors are John Ross Bates, Wonham & Magor Engineering Works; G. S. Githens, Ingersol-Rand Company; E. S. MacGregory, Erie City Iron Works, and Mr. Norton.

The New England Boiler Company, a recently organized Massachusetts corporation, is planning the establishment of a plant at Mystic, Conn., comprising a machine shop and foundry. The site is on the New York, New Haven & Hartford Railroad, from which a spur track will be laid. The company will manufacture house heating steam boilers and radiators. The authorized capital stock is $200,000. Frank A. Hazard, Mystic, is the president, and William H. Page, Mystic, is the treasurer. Mr. Page is the inventor of the steam boiler which bears his name. He has been a manufacturer of house steam boilers for 35 years and for 25 years was manager of the William H. Page Boiler Company, Norwich, Conn. The plant when completed will have a capacity of ten boilers daily.

The Whitney Mfg. Company, Hartford, Conn., states that there is no truth in the report that it plans the erection of new works on the land recently acquired in that city. No plans whatever have been made for building. The land was purchased because manufacturing property on the railroad is becoming scarce in Hartford and the company wished to be prepared for future needs.

The C. O. Jeliff Mfg. Company, Southport, Conn., is making additions to its works. Experiments will be made with a power loom for weaving the narrow lines of wire cloth, and the company's capacity for hand woven product will be increased. The manufacture of all grades of wire cloth will be continued in all grades.

The W. H. Chapman Company, Middletown, Conn., manufacturer of saddlery hardware, is building a wing to its factory, 40 x 48 feet, two stories and basement. The basement and lower floor will be used for manufacturing purposes and the second floor for offices. An Otto engine and suction producer of 75 horse-power will be installed. All other equipment has been purchased.

Brown Bros. Company, Gardner, Mass., manufacturer of chairs, will build an addition to its shop, 40 x 60 feet and four stories. The company states that it will require elevator, planer, molder, boring machine and resaws.

Luther M. Wright, South Norwalk, Conn., carriage manufacturer, is erecting a new shop building, 55 x 63 feet and three stories.

The new Norwich, Mystic & Westerly Street Railway Company has awarded the general contract for the construction of its line, the figure amounting to $500,000. A large power station will be erected, but its location is not determined.

The specifications for a new filtration plant at Ludlow, Mass., include a small noncondensing steam pumping engine and two boilers.

The Atlantic Mills, Providence, R. I., textile manufacturer, contemplates installing a 200 horse-power steam turbine. In addition figures are being received for a fan and blower system for the large works.

The Foss Valve & Specialty Company, Taunton, Mass., advertises the auction sale of its machinery, tools, patent rights and stock in trade for Wednesday, December 20. This company was recently quoted as being about to establish works at Lowell, Mass., and at the time was supposed to be in the market for a considerable quantity of machine tools.

The Bannatyne Watch Company has been incorporated in Connecticut to manufacture watches. The organization is a strong one. Franklin Farrel, Jr., Ansonia, is the president. Archibald Bannatyne, Waterbury, the inventor and "getter-up" of the Yankee dollar watch, and recently with the Waterbury Clock Company, is the secretary and manager, and George C. Bryant, Ansonia, is the treasurer. The capital stock is $45,000. Beyond the fact that a low priced watch will be manufactured the company is not yet ready to make announcement of its manufacturing plans.

William Seward, Hartford, Conn., formerly manager of the Hartford Rubber Company, is the head of the Seward Rubber Company, a new corporation which will establish a rubber manufacturing business in what is known as the Berlin Wheel Shop factory, Berlin, Conn. The company has a capital stock of $200,000, the financial backing having been secured in Hartford and New York. The machinery is now being purchased and the company hopes to be able to deliver goods in March or April.

Government Purchases.

WASHINGTON, D. C., December 5, 1905.

The Bureau of Supplies and Accounts, Navy Dapartment, Washington, will receive bids until December 19 for a quantity of supplies for the Eastern navy yards, including motor generator set, boiler feed pump, feed water heater, &c.

The following bids were opened November 24 for supplies for the Isthmian Canal Commission, serial No. 287:

Bidder 1, C. T. Patterson Company, New Orleans, La.; 5, Prentiss Tool & Supply Company, New York; 6, New Haven Mfg. Company, New Haven, Conn.; 8, Queen City Supply Company, Cincinnati, Ohio; 9, Bentel & Margedant Company, Hamilton, Ohio; 10, Halliday Machinery Company, Seattle, Wash.; 11, Stauffer, Eshleman & Co., New Orleans, La.; 12, Rahn-Mayer-Carpenter Company, Cincinnati, Ohio; 15, Handlan-Buck Mfg. Company, St. Louis,

Mo.; 18, Manning, Maxwell & Moore, New York; 19, Ridgway Dynamo & Engine Company, New York; 23, Motley, Green & Co., New York; 24, Cleveland Punch & Shear Works, Cleveland, Ohio; 27, A. D. Granger Company, New York; 28, Garvin Machine Company, New York; 29, Niles-Bement-Pond Company, New York; 30, F. S. Banks & Co., New York; 31, Sherman-Brown-Clements Company, New York; 33, Wonham & Magor, New York; 34, Royce & Ricketts, Washington, D. C.

Class 1. Two band saws, two automatic saw setting machines and one saw table—Bidder 9, item 3, $180; 15, $1410; 18, $942.10; 23, item 1, $1100; item 2, $120; 31, item 1, $620; item 2, $130.

Class 2. One car sill and timber dressing machine—Bidder 9, $1380; 15, $1725; 18, $1763.81; 23, $1820 and $2125.

Class 3. Three engine lathes and one pattern makers' lathe—Bidder 1, $2710; 5, $2382; 6, item 8 only, $1697; 10, $2684.75; 9, item 5 only, $180; 12, item 7 only, $452; 15, item 7, $530; item 8, $2000; 18, $2950.75; 23, $2225; 28, $2601 or $2761; 29, $2767; 34, item 7, $460; item 8, $1845.

Class 4. One upright drill—Bidder 1, $305; 5, $269; 15, $300; 18, $259.60; 23, $332.50; 28, $261; 29, $235; 34, $233.

Class 5. Two sets plate bending rolls—Bidder 5, $1820; 10, $2700; 15, $3700; 18, $3118; 23, $4210; 24, $2930 and $4734; 29, $4360; 34, $3580, $4780 and $3860.

Class 6. Two power double punch and shears—Bidder 5, $1800; 10, $1860; 15, $1600; 18, $2238; 24, $2526; 29, $1932; 34, $1700.

Class 10. Two valve reseating machines—Bidder 8, $185; 10, $180; 15, $180; 18, $180; 31, $180; 30, $180.

Class 11. Two lathes—Bidder 1, $1193; 6, item 17 only, $741; 10, $1040; 12, item 17 only, $791; 15, $1155; 18, $1097; 23, $700; 28, $1047; 29, $1108 and $1223.85; 34, $990.

Class 12. One 24-inch planer—Bidder 1, $595; 6, $608; 5, $545; 10, $543; 15, $600; 18, $524; 23, $565; 28, $635.

Class 13. One upright drill and one 20-inch drill, one chuck and two sockets—Bidder 1, $395.20; 10, item 20, $262.25; item 22, $8; item 23, $3; 15, $353; 18, $325.55; 23, item 20 only, $315; 28, $335; 29, $300.50; 34, $351, $366, $374 and $386.

Class 29. One horizontal counter crank engine—Bidder 23, $913; 19, $1370; 18, $1451; 10, $838; 15, $790; 27, $988 with Erie engine and $1285 with Skinner engine; 2, $725 for 95 horse-power and $780 for 110 horse-power; 33, $1798.

The following bids were opened November 28 for supplies for the navy yards:

Bidder 4, Allis-Chalmers Company, Milwaukee, Wis.; 51, Chicago Pneumatic Tool Company, New York; 56, C. & C. Electric Company, New York; 66, Crocker-Wheeler Company, Ampere, N. J.; 68, Wm. Wirt Clarke & Son, Baltimore, Md.; 72, R. W. Geldart, New York; 83, Drew Machinery Agency, Manchester, N. H.; 87, Electro Dynamic Company, Bayonne, N. J.; 97, Frye, Phipps & Co., Boston, Mass.; 103, General Electric Company, Schenectady, N. Y.; 124, Hisey-Wolf Machine Company, Cincinnati, Ohio; 125, Henshaw, Bulkley & Co., San Francisco, Cal.; 135, J. B. Kendall, Washington, D. C.; 169, Manning, Maxwell & Moore, New York; 175, Manhattan Supply Company, New York; 177, Montgomery & Co., New York; 204, S. M. Price Machinery Company, Norfolk, Va.; 213, H. A. Rogers Company, New York; 223, John B. Roache, Brooklyn, N. Y.; 225, Royce & Ricketts, Washington, D. C.; 238, Sherman-Brown-Clements Company, New York; 239, Sprague Electric Company, New York; 259, Tatum & Bowen, San Francisco, Cal.

Schedule No. 187.

Class 12. One sand belt machine, motor driven—Bidder 125, $630; 259, $378.40.

Class 13. One motor driven upright Cincinnati drill—Bidder 125, $240; 225, $237.

Schedule No. 227.

Class 91. One electric motor—Bidder 4, $425; 56, $403; 66, $359; 87, $370; 103, $380; 239, $397.

Class 93. Two electrically driven grinders and two electrically driven drills—Bidder 51, $160; 72, $283; 124, $271; 169, $283; 238, $277.50.

Schedule No. 228.

Class 101. One 125-ton bar straightening press—Bidder 72, $594.80; 83, $637; 169, $598.50; 175, $620; 213, $585; 238, $594.94.

Class 102. One 3½-inch hydraulic shaft straightener—Bidder 72, $224.45; 83, $229.50; 169, $212.62; 175, $222.40; 213, $206.50; 238, $211.93.

Schedule No. 229.

Class 176. Twenty-four hydraulic jacks—Bidder 68, $1463.50; 72, $1363; 97, $1411.50; 135, $1417.10; 175, $1224; 177, $1402; 204, $1189; 213, $1129.50; 223, $1157.55; 238, $1129.50.

Under bids opened November 21 for supplies for the navy yards the General Electric Copmany, Schenectady, N. Y., has been awarded class 21, one 5 horse-power direct current motor, $155, and class 102, seven electric motors, $1612.

Class —, one motor and attachment for lathe, will be purchased in open market.

Under opening of October 10 the General Electric Company, Schenectady, N. Y., has been awarded class 102, 40 electrical equipments, at $17,040.

Trade Publications.

Blowers.—Buffalo Forge Company, Buffalo, N. Y. Catalogues BB5 and PB5. The first deals with Buffalo B volume blowers and exhausters, and the second with Buffalo steel pressure blowers with and without adjustable beds, countershafts and Buffalo engines.

Steam Hammers.—David Bell Engineering Works, Buffalo, N. Y. Bulletin No. 805. Shows a new improved standard guide steam hammer with reinforced guides and stiffened column. This concern makes a specialty of steam hammers, building them in sizes in single frame style with falling weights of from 300 to 2500 pounds, and in "regular Bell" style with falling weights of from 250 to 1500 pounds. The principal feature of the standard guide hammers is in the use of reinforced guides and a stiffened column, making the main casting extra heavy and stronger at the points where the greatest strain comes.

Gas and Gasoline Engines.—Foos Gas Engine Company, Springfield, Ohio. Catalogue No. 16. Size, 8 x 10½ inches; pages, 39. Describes the engine in general, which does not differ materially in its several sizes from 2 to 80 horse-power. The special features of the Foos engines distinguishing them from other makes are emphasized. The engines are made in both stationary and portable patterns for general power purposes. A special type is made for the driving of electric generators, which is capable of extremely close speed regulation. More than half of the catalogue is devoted to detailed views and descriptions of the parts. An inclosed circular deals with the advantages of the Foos engine and another shows a rather remarkable test on a 5 horse-power Foos engine, which was operated at full speed while resting on polished steel rollers which were carried by steel beams machined on the top. The engine was not secured in any way. A time exposure photograph was taken without any blurring of the parts that should be stationary, due, it is claimed, to the absolutely correct counterbalancing.

Gas and Gasoline Pumping Engines.—Standard Pump & Engine Company, Cleveland, Ohio. Catalogue. Size, 6 x 9 inches; pages, 24. Contains descriptions of combination pumping engines and deep well pumping engines for supplying water to hotels, residences, greenhouses and farms. The fuel may be either gasoline or natural or artificial gas. The combination pumping engine, made in 2 and 4 horse-power sizes, has an arrangement for disconnecting the pump gearing when it is desired to use the engine for power purposes. Descriptions of these engines were printed in *The Iron Age* September 28, 1905.

Motor Belt Tighteners.—Crocker-Wheeler Company, Ampere, N. J. Flyer No. 276. Describes a newly designed automatic belt tightening attachment for the standard Crocker-Wheeler form L motor. It is intended for use where limited center distances between pulleys require an increased belt contact on the pulley surfaces.

Charging Apparatus for Open Hearth Furnaces.—Wellman-Seaver-Morgan Company, Cleveland, Ohio. Catalogue D. Size, 9 x 12 inches; pages, 32. The first part contains a number of illustrations of charging apparatus, including the Wellman open hearth furnace charging machines and charging boxes; special crane type charging machine; cupola charging mach'nes; charging boxes and cars. The second part deals with charging and manipulating apparatus for reheating furnaces. It illustrates the Wellman crane type revolving heating furnace charging machine at the Carnegie Steel Company's Homestead works, a number of non-revolving charging machines and the Berg and Dinkey bloom charging and drawing machine. Other illustrations show soaking pit charging cranes, ingot strippers, wheel blank chargers, manipulators, &c.

Electric Drills.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Circular No. 52. Descriptive of air cooled Dunkley electric drills, with tables of tests.

Electrical Apparatus.—Emerson Electric Mfg. Company, St. Louis, Mo. Booklet 4120 and bulletins. The booklet illustrates and describes small induction motors in units from 1-40 to 2½ horse-power, and gives briefly the salient features of each of the motors described. Bulletin 3201 applies to bipolar inclosed motors for direct current, Classes 522 and 622, ⅛ to 1-3 horse-power; No. 3202 describes motors for direct current, Classes 412 and 422, 1-20 to 1-6 horse-power. Bulletin 3301 deals with electric forge blowers direct connected for direct and alternating currents. Bulletin 3302 describes electric volume blowers, direct connected for direct and alternating currents, and bulletin 3701 gives description of laboratory lathes for alternating current.

Pipe Crushing and Shearing Machine.—United Engineering & Foundry Company, Pittsburgh, Pa. Pamphlet. Contains illustrations and brief description of a combination pipe crushing and shearing machine built for all sizes and lengths of wrought iron or steel pipe.

Storage Batteries.—Westinghouse Machine Company, East Pittsburgh, Pa. Illustrated booklet. Calls particular attention to the advantages of storage batteries for railway signal service.

The American Bridge Company of New York, 42 Broadway, New York City, has issued a 1906 pocket diary for the use of engineers. In addition to ample space for daily memoranda it contains much useful information of a general character; maps of the United States and its possessions, of the Russian-Japanese war territory and of the Panama Canal; illustrations of steel bridges and buildings of various types erected by the company; tables of weights and measures, including the metric system, and reference tables giving dimensions and weights of structural sections and other building members.

The American Steel & Wire Company, Rookery Building, Chicago, has issued a neat publication entitled *American Wire Rope News*. It consists of 12 pages, giving illustrations of notable buildings in which the wire rope manufactured by this company is used for the operation of elevators; of the variety of shapes in which wire is made to cover the remarkable uses which are now found for this product; also illustrations of the leading varieties of American wire rope, from sash cord to transmission rope and track strand for aerial tramways. The publication further contains a great deal of interesting information relative to wire rope, among which is Part I of an article on "Laws Relating to Wire Rope."

The Heating and Welding of Metals.

Three papers read before the Liége Congress of Mining and Metallurgy in July, 1905, relate to recent progress in methods of heating and welding metals. Two refer to new processes for self welding. Synopses of the three, which were not published at the time of the congress, but have appeared recently as part of the proceedings, are given below:

NEW PROCESSES FOR WELDING IRON AND STEEL.

BY F. JOTTRAND.

For the self welding of iron or steel there are two main processes: Welding at the forge, which was until recently the only one employed, and welding by fusion, which is effected by the blow pipe, by electricity or by aluminothermy. To this latter process the term self welding is now generally restricted. Welding at the forge, with which rolling may be substituted for hammering, though not with advantage, has several drawbacks. The iron easily oxidizes. The presence of iron oxide prevents the interpenetration of the two masses, so that the weld is imperfect; and owing to this disadvantage of oxidation welding at the forge is inapplicable to small or thin objects, because the metal burns without welding, while the necessity for hammering also renders this method not very applicable to some objects on account of their form. This last disadvantage is partially remedied by the use of a forge rapidly and easily transportable. An excellent solution of the problem is obtained by water gas, which permits of heating locally to a welding temperature, but this process requires costly and complicated plant.

The Use of the Blow Pipe.

When the power is insufficient or the application difficult welding by fusion is successfully employed. The simplest method for carrying it out is by the blow pipe, with which when the two parts are brought into contact a flame capable of giving a temperature of at least 1600 degrees C. is directed onto the line of the weld. The blow pipe flame must not be at all oxidizing, but rather reducing, so as to prevent the formation of oxide, which would impair the quality of the metal. The ideal flame is that of oxyhydrogen, obtained by the combustion of pure hydrogen by pure oxygen, and this flame can easily be regulated so as to afford the temperature required while insuring the necessary reducing atmosphere, for which it is sufficient to employ 1 part of oxygen and from 4 to 6 parts of hydrogen. The great merit of welding by fusion or the oxyhydrogen blow pipe is that it may be applied quite as easily to mild steel as to iron, and also that it permits the welding of thin plates, which formerly had to be riveted. It is also very convenient for welding on the spot, having the great advantage of being a light and very manageable tool, requiring no great amount of plant.

Fusion welding may also be effected by the use of the blow pipe, but replacing hydrogen by another substance, and the use of acetylene for this purpose has become general in France. The latter gas may have the advantage of slightly lower cost, but it cannot afford the absolutely neutral atmosphere of oxyhydrogen. Acetylene also contains a great excess of carbon, which gives the flame considerable heat that might readily bring about a carbonizing of the metal. The oxyhydrogen flame leaves the metal its ductility, but that of oxyacetylene often renders it brittle. Instead of acetylene use may be made of methane or lighting gas, both of which, however, have their disadvantages.

Electrical Welding.

Electricity affords another method, often practical and economical, of fusion welding, and it may be employed in two different ways: The voltaic arc may be used as a blow pipe, in which case the parts to be welded are connected with the negative pole, and a carbon connected with the positive pole is presented to the point of junction. The heat of the arc causes local fusion of the metal; but in this case also there is too high a temperature, not easily regulated, and therefore carburization of the metal. Again, the two parts may be placed in imperfect contact and traversed by a current of great intensity with slight tension, when the resistance will cause fusion of the metal. Although this operation is not easy good results are obtained in some cases, such as the making of chain links.

A very original process for fusion welding consists in employing aluminothermy, in which case the parts are maintained in contact and the point to be welded is surrounded by a clay mold, surmounted by a crucible filled with what its inventor calls "thermite," a mixture of iron peroxide and powdered aluminium. The aluminium combines with the oxygen of the peroxide and the iron set at liberty runs into the mold between the parts, which thus become united. This process is especially suitable for welding rails or shafting in place and for repairing broken parts. Wonderful results are obtained with fusion welding if a process be employed that does not overheat, oxidize or alter the metal. The weld in the case of thin plates and of tubes is almost as strong as the rest if they be subjected to a slight hammer hardening, while their ductility is not impaired.

THE USE OF ACETYLENE FOR SELF-WELDING.

BY E. FOUCHÉ.

The great explosibility of a mixture of equal volumes of oxygen and acetylene and the difficulties generally attending the combustion of the latter gas greatly retarded the use of acetylene for self welding; but oxyacetylene blow pipes came into operation in 1902, from which time the use of acetylene for self welding has not ceased to gain ground in small as well as in large works. The oxyacetelyene flame is obtained by previous mixture of the gases in suitable proportions in the body of the blow pipe, this condition being indispensable for the complete combustion of the acetylene. Besides, this mixture must have sufficient pressure to leave the orifice with a speed of about 100 meters (328 feet) per second, which is necessary to prevent the flame from re-entering the blow pipe. To obtain these conditions use is made either of oxygen and acetylene, both under pressure, or of oxygen alone under pressure, the acetylene having only a slight pressure as in lighting. In any case the result is the same, because on leaving the blow pipe the mixture has only atmospheric pressure and the nature of the flame only depends upon the proportions of the two gases, variable at will. When the flame is so regulated as to afford a high temperature it consists of a very small but brilliant central jet, surrounded by a far larger nonluminous atmosphere, and the consumption approaches the theoretical all the more nearly in proportion to the purity of the oxygen, the consumption of electrolytic oxygen being little greater than that of acet-

ylene. When the flame is regulated (by its appearance) the seat of maximum temperature is at the end of the central jet, where the heat is due to dissociation of the acetylene and the combustion of carbon, so that the atmosphere at this place is exclusively constituted by carbonic oxide and hydrogen.

Experience shows that under these conditions the fusion of iron and self welding are effected without oxidation. The opinion that acetylene is unsuitable for self welding because it must carburize the iron and render it short, may be justified if the flame is not properly regulated, so as to contain an excess of this gas; but the malleability of the welded portions of thin plates, which may be folded and hammered cold without fracture, shows that the quality of the metal is not impaired. In thick plates, if the elongation of the welded portion be slighter than that of the initial metal, while the resistance to fracture remains practically the same, this must be attributed to another cause, probably physical, because hammering hot increases the ductility of the welded portion.

The temperature of the oxyacetylene flame, comparable with that of the electric furnace, exceeds 3000 degrees C., and it may easily be shown that this flame is far hotter than that of oxyhydrogen.

As to comparative expense, it is evident that for an equivalent work the same quantity of heat (other things being equal) is required, and calorimetric tests show that nearly five times more hydrogen than acetylene is required to produce the same degree of heat, while the proportional consumption of oxygen is practically the same. Considering that the acetylene flame is hotter than that of hydrogen its heat is transmitted to the metal more quickly and therefore with less loss, so that in practice one-seventh the quantity of acetylene gas is required as compared with hydrogen, while the quantity of oxygen is appreciably less. Again, a given volume of acetylene costs only about half as much as hydrogen, which explains the rapid progress of the oxyacetylene weld. At some large railroad shops the substitution of dissolved acetylene for hydrogen effected a saving of 40 per cent., and the manufacture of acetylene from calcium carbide on the spot would add greatly to this economy.

HEATING AND WORKING METALS BY ELECTRICITY.

BY PAUL HOHO.

The following are the essential features of the electrical method of heating and working metals:

1. The electric energy employed is in the form of continuous current of 100 to 150 volts, which is that generally employed in industry.

2. Thanks to this electromotive force (rather high as compared with other methods of electric heating) and its relatively slight intensity, this method permits of converting almost all the energy of the current into heat on a predetermined surface of the metal to be heated.

3. The use of appropriate isolators permits of localizing the calorific action of the current in strictly defined parts of the metal surface in contact with the liquid.

4. By varying the electromotive force the quantity of heat disengaged per second on a given surface may be varied so as to regulate both the temperature attained and the speed of heating, while also permitting the attainment of very high temperatures in a remarkably short space of time.

5. These properties combined permit of heating just the part desired and no other and in a minimum of time, thus affording a maximum yield.

6. When the metal is in communication with the negative pole the electrolytic action of the current deposits thereon the positive elements of the electrolyte—first the hydrogen, owing to composition of the water. In fact, the metal is heated in contact with a layer of hydrogen, which at the high temperatures there prevailing protects this metal from oxidation and even deoxidizes it if already oxidized.

7. The rapidity of the heating and the localization of the heat thus obtained (which is not so obtained by any other process) permit of new and special applications, for instance, the surface hardening of steel. This surface hardening, which must not be confounded with case hardening (cementation), appears to be of the utmost importance for rails, shafts, axles and the internal surface of cannons. The table of a rail, for instance, may be hardened superficially (in the physical sense) to the depth desired, while the rest of the surface and all the inside is left in a fibrous condition. In the case of axles the surface hardening may be applied to the bearing parts alone.

One object of this paper is to reply to the question so often asked, Why has this method, which held out such bright hopes, not yet been carried into actual practice? A plant on a small scale has been in daily operation, however, at the Liége Exhibition. By a striking analogy this application of electricity has had the same experience as gas, which was used currently for lighting more than a century ago, while it has not been applied to firing furnaces for so long as half a century.

Cost of Production.

In metallurgy, as in all branches of industry, cost plays a principal part. For electricity, admitting the low cost of 10 centimes (2 cents) per kilowatt-hour, the expense of 1 calorie (3.968 British thermal units produced at the dynamo terminals by the electric current figures out at 0.000102 franc, against 0.000002 franc if produced by the combustion of coal costing 16 francs (say, $3) per ton, or fifty-one times dearer. These figures are of course not absolute, because prices and conditions vary infinitely, but whether electric power be produced by the latent energy of coal or gas, by waterfalls or any other means, 5 centimes (1 cent) per kilowatt-hour is now an exceptional price, and the ratio between the cost of the heat units furnished by coal and electricity is greatly in favor of the former.

Heating by coal or gas often shows an efficiency of only a small fraction of 1 per cent., but the process under consideration shows very high efficiency on account of these two properties: (1) Localization of the calorific action, and (2) its rapidity, which reduces to a minimum the losses by conductivity and thermic radiation. In some cases the efficiency may be several hundred times greater, especially as compared with the heating of small parts in ordinary furnaces and where the heating is not continuous.

If this process, like other electric processes, cannot be employed economically where coal is cheap it may find applications under two conditions: (1) For small metallurgical operations, when circumstances are not favorable for putting up improved furnaces or when electric current is cheap; and (2) for metallurgical operations generally, where coal is dear and electric current relatively cheap, though dearness of coal does not necessarily render electric energy expensive.

Leaving out of consideration the possible transformation of the calorific energy latent in coal into electric energy in a less costly manner than by boilers, engines and dynamos, there is no doubt that the cost of electric current diminishes every day and that each diminution will enlarge the circle of its application.

For supporting telephone cables across the Missouri River to connect Council Bluffs with South Omaha steel towers 125 feet high are to be erected on either bank, at a point about 2 miles south of Council Bluffs. The Government requires that the lowest point in the several cables which will span the river shall be 50 feet above the surface of the water. A crossing point was selected where the stream is narrow and the banks high, the span being 1800 feet. The towers will be high enough to be used as wireless telegraph stations and possibly will be so used some time. The work is being done by the Independent Telephone Company of Council Bluffs, which is now connecting Lincoln, Sioux City and Des Moines with Council Bluffs.

The Sloss-Shefield Steel & Iron Company, Birmingham, Ala., has taken steps which indicate that it may engage in the manufacture of steel. President J. C. Maben has asked for preliminary data covering the building of a steel plant, which will be placed before the Board of Directors for determination.

HARDWARE

THE subject of Woven Wire Fencing as a line for Hardware merchants is discussed with some fullness in the extracts from the letters of manufacturers which are given on another page. They will be found interesting and suggestive. It will be of course for each merchant to judge for himself whether or not this is a line which he can advantageously take up. Many are already making it a profitable branch of their business. There are others so situated that it would not be advisable for them to take it up. Not a few, however, will find in this direction an opening for enterprise and an opportunity to serve a wider constituency and thus enlarge their trade. These are matters which must be left to the judgment of the individual whose decision will be based upon the special circumstances of the case and the kind of business he is doing. The position which Woven Wire Fencing holds in the trade and the features which are noticeable in connection with its sale suggest, however, considerations which have a broader interest in their bearing upon general trade conditions and tendencies.

In Woven Wire Fencing there is an illustration of the changes which are constantly taking place in the market as new methods of manufacture are introduced and as new products drive out others which seemingly had made for themselves a permanent place. It is not so many years since Barb Wire came in as a substitute for the cruder methods of making fences, but now Barb Wire is being replaced to a large and rapidly increasing extent by the Woven Fencing. The tonnage in this newer and more civilized product is already enormous and is growing from year to year. Goods themselves, as well as the methods of manufacture and of distribution, are thus constantly changing in these days of ceaseless innovation.

In this line, which is of increasing importance, there is a reminder of the broadening of the entire Hardware field. The Hardware merchant is recognized almost unanimously by manufacturers as the proper channel for the distribution of the Fencing in question, and already a large proportion of this commodity is sold by Hardware merchants. An effort was made by some of the manufacturers to market this product through other agencies, or direct to the consumers, but more and more such methods have been found unsatisfactory and the enterprising Hardware merchant is recognized as the means by which the Fencing can be most advantageously sold. An important line is thus added to those the sale of which naturally belongs to the Hardware store. Fencing certainly as an Iron product comes in properly in connection with the Hardware stock, but it may be assumed that the energy and intelligence shown by Hardware merchants in marketing it was an additional reason why so large a proportion of Fencing of this character passes through the Hardware trade. This fact is in itself a testimony to the push and efficiency of the Hardware merchants as introducers and distributors. While it belongs to them it is to their credit that it is handled so successfully.

In the sale of this line there is also an illustration of the tendency on the part of enterprising retail merchants to get into direct relations with manufacturers. While they in most cases depend largely upon the jobbers for their Shelf and miscellaneous Hardware there are many classes of goods, represented in this case by Woven Wire Fencing, which they can handle much more satisfactorily under arrangements directly with the manufacturers. In many instances there is the out and out purchase of the product and in others something in the line of an agency with privileges in regard to territory, terms, &c., which are matters of negotiation. This coming together of the manufacturers and the distributers throughout the country is a notable feature of the trade in connection with a multitude of lines of sufficient importance to justify these direct relations. The stress of competition is such that retail merchants must avail themselves of all the advantages thus within their reach and be in as favorable a position as possible to take care of and extend their trade.

Condition of Trade.

It is interesting to note the unanimity with which the wholesale houses in the various trade centers refer to the great volume and satisfactory character of November business. With the entrance upon the last month of the year there is little relaxing in the pace. Trade feels the stimulus which accompanies the approach of winter weather and seasonable goods are in constant request and are going out to the smaller trade in quantities which in the aggregate are large. Wholesale merchants are kept very busy in supplying the wants of their retail customers and manufacturers in trying to meet the calls which come to them from both jobbing and retail merchants. Manufacturers are perhaps the ones who feel most the quieting influence of trade which December is supposed to exert, as the jobbers being in closer touch with the retail merchants are still busy, while the Hardware stores throughout the country are fully occupied with the work connected with the entrance on winter and the approach of the holiday season, which make December to be one of the best months in the year. With manufacturers, however, there is this December but little of a respite from the pressure which has characterized trade. Most of them are behind their orders and their customers are in want of goods. Questions, too, of policy and the conduct of business demand attention, and with the preparations for closing the year's account there is already a looking forward to 1906 and a consideration of plans for its activities. A spirit of confidence and enterprise pervades the trade and there are many indications that considerable additions will be in the near future made to the producing facilities of manufacturers. Under these conditions the market is decidedly strong and advances are from time to time being announced in various lines. The trend is in the direction of higher values, but in the great body of Hardware articles manufacturers are cautious about making changes in price, a conservatism which is to be commended and is the wisest policy in the long run.

Chicago.

November was another big month in the western Hardware trade, surpassing the same month a year ago, which showed a heavy total on account of the resumption of buying following the many price advances during its last half. A falling off in the demand for staple commodities is always expected during December for the pur-

pose of curtailing stocks before inventory, the first of the year. There is no appreciable let-up in the demand for seasonable products and the demand for heating goods and accessories has resumed after the lull last month which was due to the moderate weather prevailing throughout the West and Northwest. Jobbers' stocks of Holiday Goods are being heavily drawn upon and the sales thus far for this trade have been at a record rate. Higher prices for Sheet Copper and Bottoms have been announced as anticipated on account of the steadily advancing ingot copper market. The spread between copper ingots and sheets has been only 3 cents a pound, whereas the normal spread should be close to 5 cents. There has been a material falling off in the demand for Washers since the last advance, which was considered radical by consumers and prompt requirements have been almost generally curtailed. An advance in Nuts and Bolts is expected this month and at last month's meeting a number of the manufacturers favored slightly higher prices. The high prices prevailing for Bar Iron, which is already held at 2 cents in car lots by the leading producer, makes an advance in Nuts and Bolts and other kindred lines inevitable. While there has been no advance in Steel Bars by the mills, the difficulty jobbers are experiencing in securing material has resulted in advances of $2 to $3 from store. There is no lull in the demand for Vehicle and Implement Hardware and the production of Agricultural Implements of all kinds, Buggies, Carriages, etc., promises to be the biggest in the history of the trade. Manufacturers of Heavy Hardware continue behind on deliveries from one to three months and Nut and Bolt manufacturers are not promising deliveries before February. On account of the heavy orders booked by manufacturers of Wire Cloth, concessions from the established price have been withdrawn by most of the producers and a stronger tone prevails throughout the entire market.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Trade sales during the past two weeks have continued along the line of regular Hardware. The mild weather has retarded or interfered with trade comparatively little, but the recent cold weather has reminded persons we are nearing the holidays and orders have recently been received for the usual holiday goods of various varieties. The volume of trade we think has been quite equal to the anticipations of the wholesale dealer during the past month. The local retail Hardware houses report good trade and their calls for immediate shipment of goods indicate good results in sales.

There are indications that many of the retail houses are showing increased willingness to extend their variety of goods, and by the way this is the only possible way to prevent their trade leaving them and ordering from distant large cities either from what are known as mail order houses or large variety stores. In our own city our retail Hardware stores now realize the importance of increasing their variety of goods, and their windows as well as their shops show they are doing this. With the prosperity that now exists throughout the country and with the money in the hands of the consumers there is an increased reading of the monthly magazines published in this country, in which from one-third to two-thirds of the space are taken up by advertisements. Naturally consumers are tempted by these and if they can not get the goods in their own cities they will get them from distant large cities by mail. This fact is being realized by the retail trade throughout the country, hence the importance of their carrying a greater variety of goods than they have heretofore, and it is what the average buyer is now willing and able to purchase.

Boston.

BIGELOW & DOWSE COMPANY.—The cold weather of last week for a few days was a gentle reminder of the coming winter and stimulated sales for seasonable goods. The trade is more and more inclined to wait until the last trumpet sounds and the trade is upon them before supplying its seasonable wants. This applies more particularly to Skates, Sleds and Snow Shovels and other goods of like character.

For several years past jobbers and factories have been completely sold out, either of the one or the other or of all three of the above staple lines. It would help matters all around if the retailers stocked seasonable goods early and depended on jobbers' stocks for their later wants. Jobbers will replenish these early drafts on their stock, while it may be impossible or inadvisable to do so later. It would be an injustice to say that all retailers are so dilatory, but it is too often the case and is rather increasing.

Throughout the fall until very late in November the weather has been most delightful. Bright sunshine and crisp, bracing air give life and activity to every branch of trade. While this has been delightful to the individual the manufacturers complain of the lack of rain to fill the mill ponds and rivers that supply their power, and the merchants have not sold their usual quota of winter clothing. An excessive fall of rain in the last 48 hours has remedied one of the complaints, but it is hard for the merchants to make up their lack of sales. Trade conditions for the coming year are very favorable and there is a strong conviction that we have an advancing market before us for the coming year. Early purchases for spring wants are sure to be profitable. Heavy goods like Nails and Wire and Wire Fencing are low when one considers there is not enough pig iron in sight to supply the mills. Prices of copper are firm and advancing. It is selling freely at the highest price ever known and speculation is not a factor, but the demand for active wants.

Cleveland.

THE W. BINGHAM COMPANY.—At this time of the year when we are giving thanks for the great benefits we have received every one must certainly feel that prosperity has been and is likely to continue with us for some time to come. The great consumption of all kinds of goods that is going on all over the country, especially in the Hardware, mining, milling and manufacturing lines, is certainly encouraging to all of us, and doubtless all merchants and manufacturers feel that they are going into next year with a good volume of business and with the prospect of its being continued throughout the year. Everything is being done on a large scale. It is reported that within the last week the Pennsylvania Company destroyed 15,000 small capacity or old pattern cars—that is, relegated them to the junk heap, and in their places are building 50-ton capacity steel cars. Now this is only one small item in the category of the growth of all kinds of business.

The general Hardware business is exceedingly good at this time. Holiday goods are going forward in great volume. Good, substantial and well assorted orders are coming to us for immediate shipment. This is quite unusual at this time of the year, for ordinarily merchants cut down their purchases that they may be ready for inventory, but they must look out and be prepared for the trade that is coming to them daily and are obliged to buy goods daily in order to accomplish this. Many orders for goods are entered for shipment next year and it behooves the retail dealer to supply himself while he can at the present low prices. Sales for November were large. Competition, however, is fierce and margins of profit are small.

It is gratifying to know that our export business is increasing to such great volume that we are able out of our great and bountiful crops not only to take care of our own people but to favor the less fortunate in foreign climes.

We should feel grateful to the Giver of our great bounty that we have enough and to spare. We are thankful that we live in such a great and glorious country. May the good Lord continue to make his face shine on this, our beloved land, for many years to come, which we feel certain He will do, if we conduct our business affairs "on the square."

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—November was probably the best month in the Hardware trade this

city has ever enjoyed. On account of the large number of future orders shipped in September that is usually the record month of the year, but contrary to the experience of many years November exceeded both September and October in volume of business. The demand for goods from salesmen and by mail orders was insistent from the beginning to the end of the month. There were many calls from the trade for quick shipments.

Hardware merchants, both jobbers and retailers, have had an awakening to the effect that there are many items in the Hardware, Sporting Goods and Cutlery lines which make useful and appropriate Christmas presents. Jobbers have sent out circulars and catalogues calling attention to their Christmas lines of goods, and many enterprising and up to date retail merchants are sorting up on these lines, putting them to the front in their show windows and show cases, and thus dividing the Christmas business with other merchants in their cities.

Owing to the prosperous conditions prevailing December business should be unusually large in volume and very profitable in character.

The Continental Company has issued its prices on Screen Doors. It is working in harmony with the jobbers' associations. The company does not sell to catalogue houses. It is to be hoped that all jobbers will not only make an effort but be willing to make some sacrifices in helping the company get the Screen Door and Window Screen business out of the unprofitable rut in which it has been for the past several years to manufacturers, jobbers and retailers.

The manufacturers of Wire Cloth seem to be very wide apart and we do not see how any one can look forward under prevailing conditions to a profitable business on this line of goods the coming season. We are glad to see that the manufacturers of Poultry Netting seem to be in control of the situation.

In a number of lines we note a stiffening influence. We see nothing to prevent a very heavy spring business unless we have unusually unfavorable weather, such as we experienced in the early part of last year.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The Iron and Steel market shows unabated strength. The mills are all as busy as they can be, supplies all the while diminishing, and there is not much dependable except jobbers' stocks. To these we point with pride as a great and conservative influence in the maintenance of fair prices throughout the country and as preventive of feast or famine. They are the reservoirs of excess, the supply when other sources fail. When the advances become too rapid these stocks flow out by natural process. When the decline comes the price is steadied by the unwillingness of the astute owner to do anything rash. Probably not enough credit is given to this influence as the steadier of prices, but since the leading interest is often quoted as controlling these by mere force of resolution in directors' meetings it is only fair to give the jobber his due.

The approach of the holidays is making things lively in light goods, Toys, Cutlery and Fancy Hardware of every description. At the same time the heavier material for shops, construction, mining, &c., goes on just the same apparently. Newspaper columns are filled with advertisements for help wanted, especially skilled male help, while those for situations wanted are of very modest proportions. Whether we have to get a larger population to supply the demand or whether the demand will shrink to the proportions of the present one is something that will be interesting to note. As the bricklayer watches the erection of a ferroconcrete building and sees poured into the molds the great ladlefuls of cement and crushed stone and all that is necessary to make it concrete and realizes that it is a far more solid wall than can be made with bricks and mortar after the slow, laborious process of putting each brick in place, he must realize that the changes in his line are the feature of the day. The rock hereabout is particularly favorable to the manufacture of cement and a number of new enterprises looking for the output of this product have been recently put under way. It promises to be a source of great wealth around the Falls of the Ohio.

Baltimore.

CARLIN & FULTON.—The present month, which ends the calendar year, is always one of varied activity. The holiday business requires prompt shipment of many goods adapted to the season, while the preparations necessary for the next season's sales, added to the work incidental to the end of the year, makes the month of December anything but one of rest.

The market seems to be exceedingly strong, especially in certain lines. Many advances are being announced, with hardly a reduction occurring in anything. The statistics of the Agricultural Bureau of the Government show the basis for the most optimistic expectations as to business during the coming year and with the billions of dollars which will be put into circulation resulting from the sale of the great staples of wheat, corn, cotton, hay, &c., there will undoubtedly be an immense demand from all over this country for the varied products of our manufacturing industries.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—November closes with trade conditions in the Trans-Missouri region extremely favorable and fully as satisfactory as outlined in our previous reviews. The weather continues exceptionally fine and pleasant, so that outdoor operations are being pushed forward vigorously.

There is a constant and heavy demand for all kinds of seasonable goods, both from the agricultural and mining districts, and jobbers and manufacturers are well satisfied with the current volume of business.

Prices remain firm and no disposition is manifested to criticise the recent advances. On the contrary, they are accepted as evidences of a big trade all over the country through the first half of next year.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The Hardware people of this section were never busier at this time. The many advances in price which have been noted from time to time have had a tendency to create a buying movement among the retail dealers; the unusually high price of farm products has enabled the consumer to pay the advance. When the very prosperous condition of the agricultural, manufacturing and mining interests are considered it is hardly reasonable to expect any decrease in the demand or consequent decline in the price of Hardware. We have certainly never had a November in the Hardware business in this section where the volume has been greater or business generally been more satisfactory.

Everything indicates that the retailers are going to have a splendid holiday trade—in fact, it has already set in earlier than usual—and the retail Hardwaremen who have supplied themselves with holiday goods will within the next thirty days reap a large share of the abundant prosperity with which our country seems to be blessed. Collections are good and prospects for spring business excellent.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—With San Francisco last week showing 32 per cent. increase in clearings, Los Angeles 79 per cent., Portland 30 per cent., Spokane 76 per cent. and Tacoma 51 per cent., the Pacific Coast shows up well as compared with any other section of our country. Here in Portland each week shows an increase in clearings, although corresponding weeks in 1904 witnessed great building activity both in city and at the Exposition Grounds, employing at that time much imported labor and paying for large amounts of building materials. The closing of the Exposition showed no let up in building operations nor slump in values. On the contrary, from October 15, closing day of the Exposition, to November 15 more building permits were issued than ever before in the history of the city, and real estate is selling at prices never before touched. Railroad building is likely to be hampered by lack of laborers. Contractors already find it necessary to go East for men.

Thanksgiving Day in 1905 promises to be on the Pacific Coast of more than ordinary interest. More people than ever before should be able to eat their turkey

and take in the football game, rendering thanks for favors vouchsafed in 1905 and looking forward expectantly to 1906 for favors to come.

Trade in November has been in excess of expectations, and should the weather hold good through the greater part of December the old year will go out in a blaze of glory, the glare of which will enlighten our footsteps well into the new year.

NOTES ON PRICES.

Wire Nails.—A heavy demand both in the way of new business and specifications continues a feature of the market. November shipments compare favorably with those of the preceding month. The mills are restricting contract orders to shipment within 60 days, although buyers are anxious to cover their requirements for spring trade. Car shortage is interfering with prompt mill shipments. Prices are unusually well maintained, concessions and differentials being generally done away with. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.80
Carload lots to retail merchants	1.85

New York.—While the insistent demand, which kept jobbers a day or two behind orders, has fallen off, the requirements of the trade continue in good volume to meet current necessities. The price for small lots from store announced by the jobbers is generally well maintained, although there are some stocks of cheaper Nails which have not been entirely closed out. As most of the jobbers' contracts have run out the Nails cannot be replaced at a price which would justify selling them at the low figures which have been ruling. Quotations for small lots from store are on the basis of $2.05.

Chicago.—Both jobbers and consumers are already endeavoring to place contracts with the mills covering their spring requirements and practically extending over a period of about four months. The mills, however, are rigidly adhering to the 60-day rule and will only accept business for delivery into February. Last year both jobbers and consumers were permitted to cover their spring requirements early in November at the low prices then prevailing and considerable speculative buying resulted. The total tonnage placed in November equaled that of the same month last year, which was the largest month in the history of the Wire Nail trade. Mill shipments continue to be greatly delayed on account of the car shortage and jobbers' stocks throughout the country are very low. Indications point to higher prices before the end of the month. Quotations continue to be well maintained, as follows: No change has been made in prices, which are as follows: $1.95 in car lots to jobbers and $2 in car lots to retailers, with an advance of 5 cents for less than car lots from mill.

Pittsburgh.—We note a continued heavy demand for Wire Nails, due to the fact that a good many old contracts have expired and the large jobbers are placing new orders very freely at the full official price. The favorable weather has been an important factor in the Wire Nail trade for several months, permitting unrestricted building operations and thereby causing a heavy consumption of Nails. There is a strong feeling among some of the manufacturers that prices should be advanced and this may be done before very long. The market is extremely firm and we are advised that official prices are being rigidly held. We quote Wire Nails at $1.80 in carloads to the largest jobbing trade and $1.85 in carloads to retail merchants, f.o.b. Pittsburgh, plus actual freight to point of delivery, terms 60 days, less 2 per cent. off for cash in 10 days.

Cut Nails.—The naming of the minimum price by the Cut Nail Association, last week, of $1.70 base, f.o.b. Pittsburgh for carload lots of Steel Cut Nails, was a recognition of values which some mills had been quoting previous to the meeting. The market is characterized by a strong tone and some manufacturers with well filled order books are quoting $1.75 base instead of $1.70. Some time ago different mills recognized that the productive capacity of the country, in this line, was in excess of requirements, and accordingly reduced their output within economical limits. Quotations are as follows: $1.70, base, for carload lots, f.o.b. Pittsburgh; $1.75 for less than carloads, f.o.b. Pittsburgh; $1.85 for carload lots, on dock, New York; $1.90 for less than carloads, on dock, New York. Iron Cut Nails, at points west of Buffalo and Pittsburgh, are held at 10 cents advance on Steel Cut Nails.

New York.—In conformity with the advance made in Steel Cut Nails by the Cut Nail Association last week, small lots from store are now generally quoted at $1.95 base. Demand is in the usual proportion to that for Wire Nails.

Chicago.—The advance in prices announced as a result of the meeting of the Cut Nail Association had little effect in this market as the new prices have been in effect here for nearly two weeks. Jobbers' stocks are very low and mill shipments unsatisfactory. We quote: Steel Cut Nails, $1.85 to $1.90 in car lots and Iron Cut Nails, $1.95 to $2.

Pittsburgh.—Following the advance of 5 cents a keg in price of Cut Nails, made on November 28, another advance of 5 cents a keg has been made, effective from Tuesday, December 5, and the market is very firm. While the two Cut Nail mills in the Wheeling district are not members of the Cut Nail Association, they are understood to observe official prices very closely. New demand is fair and specifications on contracts are coming in very freely. We quote Steel Cut Nails at $1.75 base, f.o.b. Pittsburgh, in carload lots, with an advance of 5 to 10 cents a keg for Iron Cut Nails.

Barb Wire.—The market is firm and although new business is light specifications on contract orders placed some time ago are being received by the mills for liberal shipments. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots	$1.95	$2.25
Retailers, carload lots	2.00	2.30
Retailers, less than carload lots	2.10	2.40

Chicago.—There is already some inquiry to cover requirements for the spring trade, but as yet no contracts have been placed. The big movement in Barb Wire is expected to set in early next month and the new business that is now being placed is extremely light. Quotations continue to be well maintained and are as follows: To jobbers, Chicago, car lots, Painted, $2.10; Galvanized, $2.40; to retailers, car lots, $2.15; Galvanized, $2.45; retailers, less than car lots, Painted, $2.25; Galvanized, $2.55; Staples, Bright, in car lots to jobbers, $2.05; Galvanized, $2.35; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—As usual at this season of the year very little new tonnage is being placed, but the mills are receiving liberal specifications on contracts booked some time ago. Conditions are likely to remain as they are at present until spring trade opens up early in the new year. The market is very strong and there is some talk of an advance in prices prior to January 1. We quote Painted Barb Wire at $1.95 and Galvanized at $2.25 in carload lots to the large jobbing trade, with the usual advance of $1 a ton to retailers in carload lots, f.o.b. Pittsburgh, 60 days, or 2 per cent. off for cash in 10 days.

Smooth Fence Wire.—There is a small demand in the way of new business, but mills are busy shipping on contract orders. The tone of the market is firm at the following quotations, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.65
Retailers, carloads	1.70

The foregoing prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12&12½	13	14	15	16
Annealed	Base	$0.05	.10	.15	.25	.35	.45	.55
Galvanized	$0.30	.35	.40	.45	.55	.65	1.05	1.15

Chicago.—Specifications continue heavy and are in excess of mill shipments. The car shortage is also greatly interfering with deliveries. Little new business is being

placed, as contracts covering requirements well into next year were placed two months ago. Prices are firmly maintained, as follows: $1.80 to jobbers, f.o.b. Chicago, in car lots, and to retailers, car lots, $1.85.

Pittsburgh.—Current business is of small volume, but specifications on contracts are coming in very freely. The large trade is well covered for some time ahead and new business is likely to continue light until spring trade opens up. The market is firm and it is claimed official prices are being rigidly held. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads	$1.65
Retailers, carloads	1.70

The above prices are for base numbers, 6 to 9.

Bright Wire Goods.—An advance in the price of Bright Wire Goods was announced last week, which, it is reported, was the result of concerted action on the part of the leading manufacturers. The market is now represented in a general way by discounts of 90 and 30 to 90 and 30 and 10 per cent., although lower prices are being made by the jobbing trade, most of whom have stocks purchased before the advance just made. The present moderate advance is declared to be but a tardy recognition of market conditions, a large volume of business being reported, with all manufacturers considerably behind their orders.

Sheet Zinc.—Under date December 1 Matthiessen & Hegeler Zinc Company, La Salle, Ill., announces an advance in the price of Sheet Zinc to $7.75 per 100 pounds, f.o.b. La Salle, in 600-pound casks, subject to the following discounts for cash and quantity:

	Cash with order. Per cent.	Quantity. Per cent.	Total. Per cent.
Carload lots	3	5	8
9,000-pound lots	3	3	6
6,000-pound lots	3	2	5
3,000-pound lots	3	1	4
Less than 3,000 pounds	3	0	3

Copper and Brass Products.—As foreshadowed in our last issue advances have been made in many of the leading Copper and Brass materials and products, which, it is said, will probably be followed by still further advances. This opinion is based on the present situation in the shortage of Copper. It is becoming more difficult to get deliveries, the market being congested so far as December and January shipments are concerned, there being more leeway in February and March deliveries. December 1 the following discounts were announced, all of which are advances: Sheet Brass, discount 17½ per cent.; Brass Wire, discount 15 per cent.; Brass Rods, discount 22½ per cent., and Brazed Tubing, Copper and Brass, discount, 25 and 2 per cent. The above prices are only shaded for large mill shipments. On December 4 the following advances were made: Sheet Copper, 2 cents per pound, to 23 cents, base; Seamless Tubes, Brass, 2 cents, to 22 cents, base, and Copper, 2 cents, to 25 cents per pound, base; Soldering Coppers, ½ cent per pound, to 22 cents, base, for 300 pounds and over; smaller quantities an advance on this. Copper Rivets and Burs were also advanced to 50 and 5 per cent. discount; Burs only, 30 per cent. discount. Copper Bottoms, Pits and Flats, following the advance in Sheet Copper, are now 27 cents, base (for 14 ounce), with the regular advances for lighter weights. Bare Copper, used principally for electrical construction, advanced ½ cent per pound, to 19¼ cents for carload lots and 19¾ cents per pound for less than carloads.

Rope.—Demand shows a slight falling off, but is regarded as excellent for December. Quotations are as follows: Pure Manila, 12½ cents; B quality, 11½ cents; Pure Sisal, 9½ cents; No. 2 quality Sisal, 8 cents per pound.

Window Glass.—Manufacturers' prices of hand made Glass have shown no improvement, though demand has been somewhat better at the factories. As explained last week, selling prices are at figures which mean a loss to a large proportion of hand made factories. The American Window Glass Company is reported as still quoting a discount of 90 and 30 per cent. on the first three brackets and 90 and 10 and 5 per cent. on larger sizes.

Linseed Oil.—The demand is sluggish and is confined to small lots. The lower prices ruling for the last two weeks were recognized by the crushers in a reduction in card rates to conform with figures at which Oil has been actually selling. Quotations for prompt delivery are as follows: State and Western Raw, 36 to 37 cents, according to quantity; City Raw, 38 to 39 cents per gallon. Boiled Oil, 1 to 2 cents advance over the prices of Raw.

Spirits Turpentine.—An improvement in demand at the South from domestic and export buyers has stiffened the market and advanced prices have been reflected in the local market. Local business is light, as dealers are fairly well supplied through recent purchases. The market shows an advance of about 2 cents over that of last week. New York quotations are as follows, according to quantity: Oil Barrels, 65 to 65½ cents; Machine Made Barrels, 65½ to 66 cents.

NEW ENGLAND HARDWARE DEALERS' ASSOCIATION.

AN enthusiastic meeting of the Executive Committee of the New England Hardware Dealers' Association was held in the committee rooms of the Boston Merchants' Association on the 5th inst, President Hunter presiding. After an encouraging report by Secretary Chandler, Treasurer Sanders reported a balance of $258 on hand, all bills paid. Advance plans for the annual convention were decided on. It will be held on March 1 and 2, 1906, in Boston, the Hotel Vendome being headquarters. Increased membership, enlivened interest, real issues and energetic trade friends point the way to a very successful convention. President Bogardus and Secretary Corey, of the National Retail Hardware Association will, it is expected, be present. All in all the occasion promises to be the "greatest ever" in the retail Hardware association movement in New England.

TRADE ITEMS.

HARRINGTON & RICHARDSON ARMS COMPANY, Worcester, Mass., has issued a very attractive hanger calendar for the coming year. The pictorial portion of the calendar artistically enforces the accuracy of the company's Revolvers and Shotguns.

THE EDGE TOOL business of the late Charles Buck, Millbury, Mass., has been incorporated under Massachusetts laws, with a capital stock of $10,000. The officers are: President, Maria C. Buck; treasurer, Fred. C. Wheeler; clerk, Charles F. Crossman, all of Millbury, the officers constituting the Board of Directors.

THE WHEELING ENAMELED IRON COMPANY, Wheeling, W. Va., has been organized to manufacture a line of Heavy Enameled Iron Ware, such as Bath Tubs, Sinks, Sanitary Specialties, &c. The authorized capital is $125,000, of which $80,000 has been subscribed. The officers of the company are as follows: C. W. Franzheim, president; W. A. Isett, vice-president; George W. Franzheim, secretary, and George Blackham, general manager. The plant of the Wheeling Heating & Ventilating Company at Elm Grove, a Wheeling suburb, has been taken over by the company and is now being put in shape for operation shortly after the first of the year.

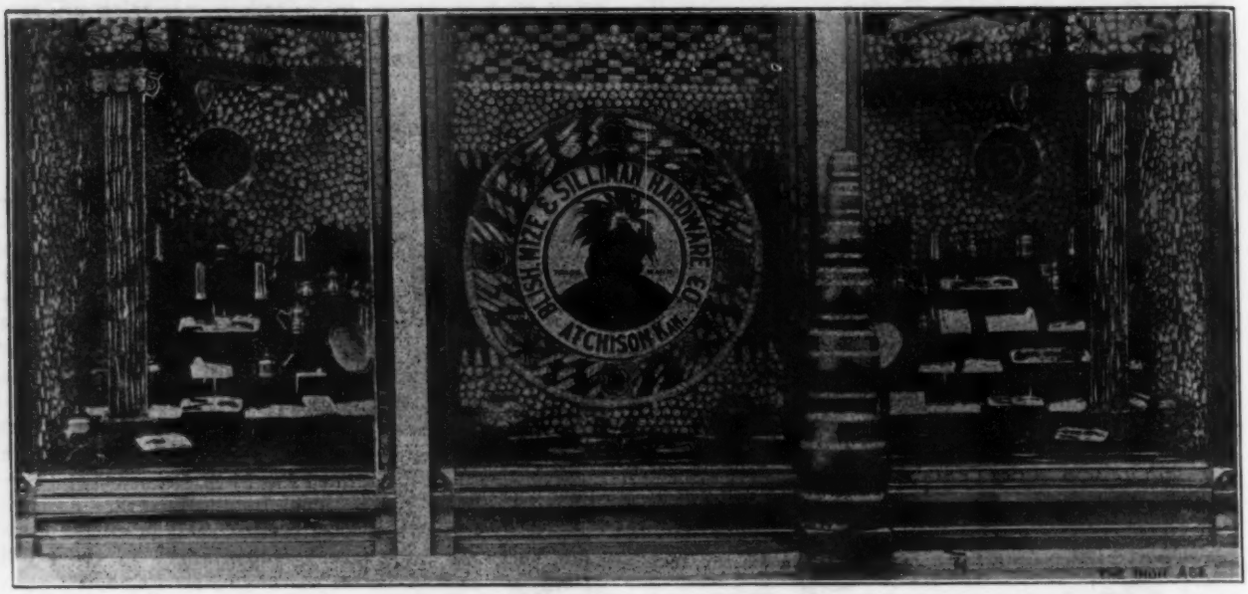
THE CHAPIN-STEPHENS COMPANY, Pine Meadow, Conn., calls attention to the appropriateness of Ivory Rules as holiday gifts, and in anticipation of an increased demand from this source the company has in stock a very complete assortment of these goods. That Ivory Rules are quite suitable for holiday remembrances and that this fact was realized many years ago is borne out by an experience of one of the officers of the company, who was recently shown an Ivory Rule made by H. Chapin which had served as a New Year's gift to a young woman in 1838, and which, by the way, is still in an excellent state of preservation.

TRADE WINNING METHODS

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

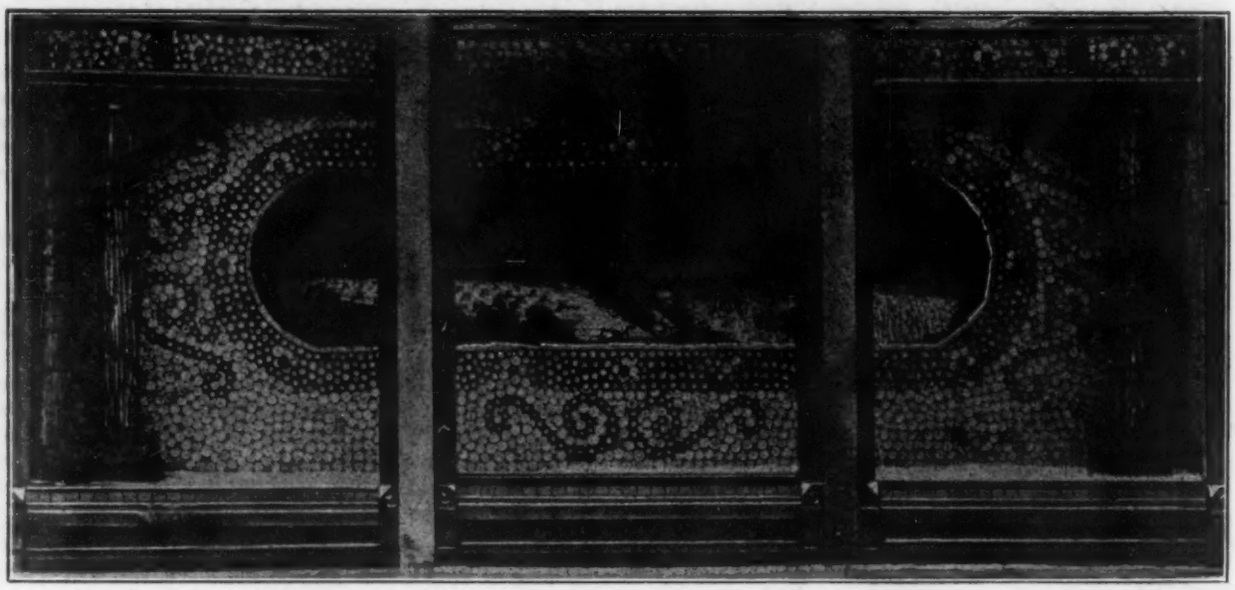
CORN CARNIVAL WINDOW DISPLAYS.

WESTERN Hardwaremen are well known for their progress and for their loyalty to local industries. A Kansas man is sure to feel that there is no State in the Union equal to his own and that the farm products of his State are superior to any other. Recently Atchison, Kan., celebrated its annual corn carnival. The entire town put on gala dress. Excursions were run from all parts of the surrounding country and thousands of people visited the city. With their usual push and enterprise the Blish, Mize & Silliman Hardware Company arranged special window displays appropriate to the occasion. Reproductions of them are given herewith.



Corn Carnival Window Display.

In the first window the centerpiece represents the company's trademark. For the backing and sides of the window ears of corn were used, in some places cut diagonally, while in others arranged crosswise. The second window was most decidedly a work of art and, with the exception of the centerpiece, was arranged entirely with cobs of corn. The picture in the center represents a farm scene and by the use of a mechanically operated steam train and grain elevator seemed most real. At times a crowd of people extending into the roadway stood before this window. In all something over 14 bushels of corn were used in the two window displays.



Corn Carnival Window Exhibit with Moving Railroad Train and Grain Elevator.

A BOSTON STORE'S SPECIAL WEEKLY SALES.

S. H. DAVIS & CO., corner Portland and Sudbury streets, Boston, Mass., make a specialty of weekly sales on certain lines of goods which are displayed in their windows during the continuance of the sales. The firm occupies two floors and a basement and has five show windows. During a recent week, which, by the way, was the one hundredth occasion of the special sales, one of the windows was entirely devoted to appliances and articles for the bathroom. The other windows were occupied with displays of Mechanics' Tools, Fishing Tackle, Chafing Dishes and Cutlery. S. H. Davis & Co. are successors to Davis, Stebbins & Co., who established the business at 33 Sudbury street, a part of the present store, 34 years ago. Their trademark is "If it's Hardware, see Davis, the Hardwareman."

A SET OF CIRCULARS.

SOME TIME since Bard & Cheney, Hardware merchants and plumbers, Port Allegany, Pa., got out a series of circulars, five in number, one of which, reduced in size, is reproduced herewith. The firm has a mailing list comprising about 500 persons in its locality. A full set of the circulars was not sent to every one on this list, as, for instance, the circular relating to plumbing, which was mailed to property owners and others who might be interested in this line. One of the circulars was devoted to Paint, Varnish, Brushes, &c. Another talked about Mantles. A third, the largest of the series, had to do

Port Allegany, Pa.,

GOING TO BUILD OR REMODEL?

If remodelling, you will do it with the intention of improving upon present conditions. Our part is to interest you in our ability to improve and perfect your sanitary equipment. If building, you will want careful and painstaking workmen, as well as accomodating ones. Perhaps we could help you select some of the fixtures which you may be undecided upon. We are are at your service at any time.

We do but one kind of work—the best—and use the famous Standard Ware, every piece of which is guaranteed. Let's talk it over—we have some samples in our showroom, which we would like to show you. We will gladly give you an estimate on any work you want done. No job too large—no job too small—to secure our prompt and careful attention. We also do Tin Work, put up Eaves Trough, Etc.

THE OLD WAY.

Steam and Hot Water Heating.

You don't need to get an out-of-town firm to do a job of this work. If you are contemplating putting in a system we will be only too glad to figure on it and can assure you that on the same material and same heating capacity we can save you money, as we have no extra expenses to figure in for car fare, board, etc.

Pipe, Valves and Fittings.

We carry a large and well assorted stock of Pipe and Valves from ⅛ to 2-inch, and Fittings from ⅛ to 1-inch. Both black and galvanized up to 2 inch. We have special prices for users of large lots.

THE NEW WAY.

BARD & CHENEY.

HARDWARE, STOVES, HOUSE FURNISHING GOODS.

PLUMBING, GAS FIXTURES, TINNING.

Telephone 5-A. MAIN STREET.

One of the Circulars, in the Interest of the Plumbing Department. Actual Size, 9½ by 7¼ Inches.

with Silver Plated Ware, Ice Cream Freezer, Washing Machine, Bread Mixer, Food Chopper, &c. The other circular was the introductory one and in it the firm did "a little tooting of its own horn." The public was invited to come in and notice how much nicer the store looked than ever before, a little paint, some new paper, showcases, &c., making it "nice enough for a jewelry store," the stock being also "much larger and better assorted," with "quality always first in mind."

The circulars were sent out about one week apart. They were folded so that the stamp held them together. They were dated with a rubber stamp, so that copies of each of the circulars might be kept in reserve for circulation among new families or residents. All were illustrated, prices being also mentioned in some cases.

PEIRSON HARDWARE COMPANY, Pittsfield, Mass., has recently rearranged its establishment so that the counters and show cases now extend right through the center of the store. This leaves an aisle on either side, so that customers can walk right up to the shelving on each side of the store and make a close inspection of the sampled articles. The rearrangement has also added materially to the attractiveness and convenience of the emporium.

Oesch Hardware Company, C. R. Oesch, proprietor, has purchased the Hardware business of W. P. Baily at Beloit, Ohio.

Bickel & Jones, Cushing, Iowa, have been succeeded by J. C. Jones, who will continue the Hardware, Stove and Paint business.

KEEPING TRACK OF STOCK.

A SYSTEM by which a large and complicated Tool stock is absolutely controlled by the head of the department is in use by Hammacher, Schlemmer & Co., Thirteenth street and Fourth avenue, New York. The firm's business includes retailing goods over the counter, mail orders resulting from advertising and orders from traveling salesmen. The system has thus been adapted to both retail and wholesale requirements.

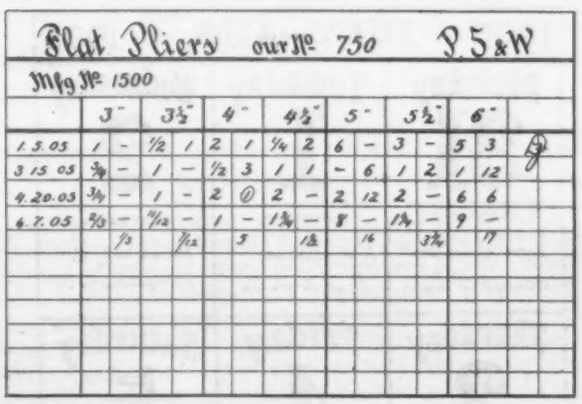
Some Advantages.

The system permits the stock always to be kept in normal condition so as to have fresh goods on hand to sell, the keeping down of unnecessary supplies and prevents running low or completely out of goods. It enables the head of the department to use relatively inexpensive help to do the detail work. It keeps the head of the department in touch with the exact condition of stock and allows him to increase or decrease it in accordance with the condition of the market by keeping the reserve or surplus stock low when prices are dropping or buying when goods are about to advance. In buying the fact is not lost sight of that while money can be saved by purchasing large quantities it can be lost by carrying too large a reserve stock. By the use of the system buying or decreasing stock is not dependent upon the verbal report or the ideas of stockmen.

Record Cards.

To install the system it is necessary to find out the exact stock of goods on hand, the resulting record being kept on record cards 4 x 6 inches in size, one devoted to Flat Nose Pliers being shown in Fig. 1. The firm's number and that of the manufacturer are both entered at the top of the card, with the maker's initials.

The columns on the cards are headed with the sizes


Flat Pliers our № 750 P.S.&W

Mfg № 1500

	3"		3½"		4"		4½"		5"		5½"		6"		
1.5.05	1	–	½	1	2	1	¼	2	6	–	3	–	5	3	
3.15.05	¾	–	1	–	½	3	1	1	–	6	1	2	1	12	
4.20.05	¾	–	1	–	2	0	2	–	2	12	2	–	6	6	
6.7.05	⅔	–	⅝	–	1	–	1¾	–	8	–	1¾	–	9	–	
		⅓		⅛		3		1⅞		14		3¾		17	

Fig. 1.—Record Card, Showing Stock on Hand, Quantities Ordered and Sales.

of goods carried in stock. In the first of the two columns under each size is entered the quantity of goods on hand at the time of stock taking and in the second column the quantity ordered, if any, on the same date. One clerk devotes his entire time to taking memoranda of stock and the result of his work on Flat Nose Pliers on January 5 is shown on the first line below the sizes. There were on hand at that time one dozen 3-inch, one-half dozen 3½-inch, two dozen 4-inch, &c. On the same date an order was placed for one dozen 3½-inch, one dozen 4-inch, &c. No order was given for 3-inch, as one dozen was considered a sufficient stock of that size.

On March 15 a memorandum was again taken, when on the 4-inch size, for instance, there were one-half dozen on hand, showing that two and one-half dozen had been sold in two months, and an order for three dozen more of this size was given. On April 20 there were two dozen 4-inch in stock, one and one-half dozen having been sold in one month, and an order was placed for one dozen. On June 7 one dozen 4-inch was on hand. The order of April 20 remained unfilled and a ring was put around it to show that it was back ordered.

A Base for Ordering.

On the 4-inch size two dozen are used as a base for ordering, one dozen for new supply and one dozen as a reserve for unexpected orders. It has been found by experience that certain goods will have a standard similar to this size of Pliers and that by maintaining a standard supply for current requirements and an extra supply for reserve the stock seldom runs short. If the order for one dozen in April should be unfilled at the time the next memorandum was taken another ring would be put around it. The figure 5 under the 4-inch column indicates that five dozen of this size had been sold during the five months.

From the record the 6-inch size would be regarded a good size to make a leader of. It will be seen by the card that on March 15 there were one dozen on hand, that seven dozen had been sold in two months and that 12 dozen were ordered on that date. On April 20 there were six dozen on hand, seven dozen having been sold in one month, and six dozen were ordered. On June 7 there were nine dozen on hand, the number 17 in small figures below showing that 17 dozen had been sold in five months.

Special Brand Goods

usually have to be purchased in large quantities. The record established on the cards by the numerous entries gives the exact rate of the firm's sales. If the prospective sales do not quite make up an order the surplus necessary is made up of the best sellers of other goods of the same manufacture, as shown by the record of sales on the cards.

Filing the Cards.

A card is devoted to each line of goods and the cards representing the goods purchased of any one maker are filed together. The advantage of filing cards in this manner is that the clerk can take a memorandum of any

Fig. 2.—Calendar of Memoranda Work for One Week as Laid Out by the Department Manager.

manufacturer's entire line without being in danger of overlooking any goods. This permits the order for goods being large and complete, saving unnecessary freight or express charges. Another advantage of filing all cards of one manufacturer together is that when there is an advance or decline the prices of all goods of any particular make can be changed without delay. In response to a query from the advertising department as to what goods are bought from any one manufacturer the information can be quickly given.

Stock memoranda are taken of active goods once a month, the idea being to go over the entire stock within that time. In taking memoranda all the goods made by any one manufacturer are taken together and not according to the class of goods.

The Calendar Plan.

Commencing with January 1, one month's work is laid out on a calendar by the head of the department, one week of which is shown in Fig. 2, and this order is followed throughout the year in taking memoranda.

The system is elastic and broad in scope, not being restricted merely to a routine record of stock on hand and goods ordered. The tool department, on the retail floor, is divided into five sections, with a man in charge of each section, who orders goods from surplus stock to keep his section filed. In case any line of goods needs investigating the head of the department orders the stock clerk to look into it.

Goods Out.

Any one handling the goods, whether the person in charge of a section of any department on the retail floor or stockmen on the different floors, is expected to furnish to the head of the department a slip like that shown in Fig. 3 when goods are low or entirely out. The head of the department frequently gets two or three slips in succession reporting the same goods short. Upon comparing orders and sales on

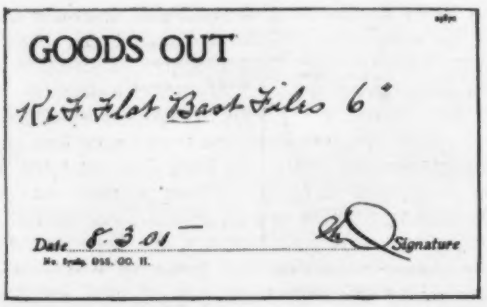


Fig. 3.—Goods Out Slip Sent to Department Manager When Goods are Low and Running Out.

the record cards it may seem to him hardly possible that the stock is exhausted unless there have recently been unusually large sales. Investigation follows and often discloses the fact that the surplus stock had been put in the wrong place. This gives the head of the department an opportunity to correct the error and to tell the stockman where the surplus stock should be put in the future. If, on the other hand, it is found that the stock is low or exhausted it would show that the goods were going out in increased quantities, and the head of the department can increase the stock accordingly.

A large order might be shipped direct from factory to a purchaser who for some reason might return the goods to the firm without notification and the goods thus be put in stock. Some time within a month the head of the department would discover by the record cards that there were more of these goods in stock than had been ordered. He would then be in a position to arrange with the purchaser to use the goods or to make some other satisfactory arrangement for their disposition.

Stimulating Sales.

There are times when a good line of goods which does not seem to sell needs stimulating. Salesmen on the road are instructed to push it or the advertising department is requested to advertise it. In the course of a week or a month the cards will show what the results are. If there are no indications of increased sales the salesmen can be taken to task for not talking up the goods. If the advertising department is not obtaining results the cause can be looked into.

If it should be desirable to test the sales of any particular line or lines of goods sold over the counter, by traveling salesmen or as the result of advertising cards could be arranged with three columns for the quantity of goods sold, one for each of the above mediums.

Central Hardware & Supply Company, Lewis, Kan., has been incorporated with a capital stock of $15,000. It will handle Hardware, Stoves, Implements, Paints, Sporting Goods and Automobiles.

LARGER MARKETS FOR AMERICAN MANUFACTURES.

JOSEPH H. CHERRY, who for some years has been in charge of the export department of Sargent & Co., New Haven, Conn., and New York, manufacturers of Builders' and general Hardware, recently arrived from Liverpool by the steamer Caronia, completing a business trip around the world begun March 23, 1904. Mr. Cherry went via San Francisco to Honolulu and thence to Sydney, N. S. W., remaining in the Australian colonies 14 months. The journey back began in July last and was by way of Ceylon and the Suez Canal to Marseilles, where he arrived August 6. The European trip included Genoa, Milan, Vienna, Paris, Berlin, Hamburg, London, Edinburgh, Glasgow, Copenhagen, Stockholm and Christiania. Mr. Cherry took out 14 trunks of samples, many of which were left in Australia, the European trade being more in Hardware specialties peculiar to America and goods that could be sold largely by means of the catalogue.

Builders' Hardware in Australia.

Mr. Cherry speaks of a considerable increase in the demand in Australia and New Zealand for Builders' Hardware made in the United States, a demand that has been growing for the past five years especially. That market now takes all grades of American Builders' Hardware from the very cheapest to the very best. Much valuable introductory work has been done and the work is going along satisfactorily without a hitch, the main difficulty having been to get American goods introduced. Merchants, architects and builders are becoming accustomed to American styles, the trade in which is also being pushed by the representatives of such well-known American producers as the Russell & Erwin Mfg. Company, Yale & Towne Mfg. Company, Reading Hardware Company and others. There is plenty of competition, but it is such competition as is met right at home. Sometimes it is American competition and sometimes British, the buying as a rule being for goods in these lines of British or American origin, German and French competition not being a factor. Goods of American manufacture have obtained a footing on merit.

American Displacing British Goods.

The business for American manufacturers, however, is obtained at the expense of British makers, but not because Australia is growing. The labor party is in control in all the important States of the Australian Commonwealth and legislation is of such a character that a bad effect is produced on trade. Capitalists will not invest there and that keeps the country back. It is also noticed that Australians visit the United States more than ever.

European Staple Hardware Holding Its Own.

In Europe standard and staple American Hardware so far does not find a large market for such goods as regular inside and outside Locks, Butts, Bolts, &c., where the home product has an advantage in price. Locks and similar goods made in Sweden are referred to as fine examples of the craft in both material and workmanship. Many American patented specialties, including Door Checks, fine Padlocks, Cylinder Locks and Latches, &c., however, find a good market, imitations of Door Checks, for example, being poor substitutes.

Owing to business stagnation in South Africa Mr. Cherry did not include that territory in this trip, as he had on a former one, and no attempt was made to do business in India during the short time he was there on the way back to Europe.

Value of Expert Introduction.

The experiences here referred to briefly still further confirm the unquestionable value of intelligent, persistent and faithful work in the introduction of American products. Once thoroughly introduced in these and other countries, if there is a demand for the kind of article, American made goods will almost invariably hold their own at anything like a parity in price. The surest and best way to enlarge our markets is for strong concerns with lines large enough and of sufficient importance to warrant the expense to send out their own specially trained employees, who are competent to overcome conservatism or prejudice, and demonstrate the suitability and superiority of American manufactures that will serve a given purpose better than similar goods made in Europe.

Letters from the Trade.

Catalogue Houses and Special Brands.

From an Ohio Manufacturer: In your issue, November 23, we read with pleasure the views of a manufacturer on the catalogue house question and the selling of jobbers' special brands. This special brand business is of no value to any one but the jobber. In a great majority of cases these special brand goods are not equal to manufacturers' brands. Some manufacturers are even weak enough to sell and warrant these goods, so the jobber runs little or no chance if they are returned. If the manufacturer refuses to make them a second season some other manufacturer is approached and takes the contract. There is no certainty of the quality of the goods sold under special brands.

As our good friend says, the retailer may be selling the same goods as the catalogue houses if he handles special brands. We want to say the good square retailers who pay their bills promptly (and all such do) are the best friends of the manufacturer, and the manufacturer appreciates their trade, for their demands are reasonable. By refusing to purchase from manufacturers and jobbers any goods which are being sold by catalogue houses under special brands or otherwise the retail merchants can stop the supply to the catalogue house people. It is up to the retailer to wage this warfare on all concerns who deal with catalogue houses and who sell special brands.

Manufacturers, Jobbers, Hardware Brokers and Retail Merchants.

From Manufacturers' Agents in the South: Can the Hardware jobbing houses distribute all goods made by the manufacturers? This question is one of vital importance, not only to the jobbers, but especially to the Hardware brokers. The general tenor of reports coming from retail Hardware merchants throughout the Southern States tends to show that there is dissatisfaction arising between them and their jobbing friends, so-called. They say that they are placed in a position where they cannot buy goods from the nearest Hardware jobbers because these so-called jobbers go after business which legitimately belongs to the retail merchants, and sell at prices which the retailer cannot profitably meet.

Practically the same conditions exist between the jobbing trade and the Hardware brokers. Can the broker profitably to himself protect the jobber on orders secured from retail merchants for direct shipment from factories? This is what the jobbers expect, and yet the jobbers claim they cannot buy the goods through the brokers and carry them in stock, for they are new goods on the market and the jobber has no trade already established in these lines. Under these conditions the manufacturers must solicit the trade of the retail merchants, so that their goods may become known and popular. After such goods are so placed on the market that there is a general demand for them the jobbers are all anxious to put them in stock.

Should not the jobbers buy goods through brokers as much as possible, so they can get closer to the manufacturers and receive protection which they desire? Or, are the jobbers fighting the brokers and forcing the manufacturers to solicit the retail trade direct? Who are the manufacturers to protect, the retail merchants who are giving them business, or the jobber who is fighting them?

THE DISTRIBUTION OF WOVEN WIRE FENCE.

WITHIN a few years Woven Wire Field Fence has come to occupy a leading position among the Wire products manufactured in the United States. The annual production is now estimated at 500,000 tons, thus holding a place among Wire products second only to Wire Nails. This large tonnage is divided among 75 to 100 manufacturers, whose individual output ranges from 50 tons to thousands of tons per annum. Opinions differ as to how much of the Fence produced is marketed through the Hardware trade, but it is generally agreed that the proportion is large and growing rapidly.

The Introduction of the Line

was attended by much the same difficulties as were met in introducing improved Agricultural Implements and Farm Machinery. Sales were slow and laborious because of the large initial outlay necessary on the part of the consumer, and merchants felt that time could ill be spared from their regular lines for the talking and demonstrating needed even after the location of a possible buyer, to say nothing of the attention and oversight required after a sale. Moreover the Fence was awkward to handle and bulky to store. Therefore much of the introductory work was done by special and farmer agents, by manufacturers who advertised in the country home and farm papers and magazines, supplying the consumer direct, and by small producers locating in favorable sections, who placed their entire output in the neighboring communities. Of course a few far sighted merchants did pioneer work, the number growing with the increase in the demand. Manufacturers on their side made every effort to interest the Hardwareman, not approaching him through the medium of the jobber, but

Offering Inducements

in the way of exclusive territory, direct sales and low prices on reasonable quantities. Consumers also addressed their inquiries to retail merchants, and thus within a few years, because they were the natural distributors of such a product, Hardware merchants have attained a commanding position in the market.

Manufacturers' Views.

The manufacturers of Woven Wire Fence view this result with satisfaction and show a surprising unanimity in their opinions and policies, as indicated by the following expressions:

From a Manufacturer in Pennsylvania: Our lines are sold to the Hardware trade almost exclusively. The only occasion on which we sell to the consumer direct is when there is no dealer in the town handling our line. We advertise extensively in the country, home and farm papers and current magazines and turn the results therefrom over to the dealers. We prefer this method of selling our goods and do not care to do a mail order business, although the average price received from our product is not as large as it would be from mail order customers.

Helping the Merchants

From a Manufacturer in Indiana: We operate only in the Central States, and in that territory we think nearly every Hardware merchant sells Field Fencing, and we are satisfied that the same condition prevails throughout the entire country. Woven Field Fencing is unquestionably crowding out Barbed Wire to a great extent, and the demand for the Woven Fencing is growing larger from year to year. We believe that it will almost altogether take the place of Barbed Wire and Plain Wire Fences after a time.

Crowding Out Barb Wire

From a House Manufacturing a Portable Fence Weaving Machine: Almost every retail Hardware store has some one variety of Bundle Fence. Some manufacturers do not sell to the trade; these try to sell direct to the farmers. There is another class who cater to the trade. Farmers try to stretch it up themselves, but the best results are obtained by experienced men who make it their business to stretch Wire Fence. The market in Wire and Wire Fence is so light that an effort is being made to cut out the middleman. There is a tendency among farmers to get something cheap and there is always somebody ready to manufacture cheap goods to satisfy this demand. A great deal of low Fence, 25 to 36 inches high, called Hog Fence, is being put up. Barbed Wire is stretched above this. Putting up this Hog Fence is a great mistake, as it will be only a short time before it is all smashed down and has to be replaced, while if they put up a Fence that is 48 inches high with one Barbed Wire on the top they would have something more permanent. Farmers are so apt to put up something "that will do for this year."

Farmers' Tendency Something Cheap

From a Manufacturer in Illinois: As far as we know Woven Wire Fence is very generally sold. However, some merchants do not carry it in stock, but sell from sample. We find the people who meet with the best success are the ones who carry it in stock, even though it may be in small quantities. The Hardware trade are as much disposed to handle the Woven Wire Fencing as to handle Nails and Barbed Wire. We think the former would be kept more generally in stock if so many of the merchants were not handicapped for storage room. Woven Wire Fencing is rather bulky and many merchants have no room for it; and then we think the disposition of many merchants is to keep two or three kinds, and that requires still more room, which results in their oftentimes being compelled to order from the manufacturer as they have call for it.

Fence in Stock the Better Way

From a Manufacturer in Michigan: Woven Wire Fencing is handled to a very considerable extent by the Hardware and Implement trade. It would be our estimate that fully two-thirds of the entire tonnage is so placed, the remaining one-third being covered by direct sales of the manufacturers to the railroad and transportation companies and the balance going to individual agents in the rural communities that were created in the early days of the Woven Wire fence trade. We have a good many excellent customers who are primarily Hardware dealers, but of course the city trade cannot do very much with this class of goods. What it requires is a firm in close touch with a thriving agricultural country that is largely given over to diversified farming, preferably dealers who keep men circulating among the farmers in their section calling to their attention and selling to them various implements and other seasonable goods for which the farmer is a customer.

What Is Required

From a Manufacturer in Indiana: We believe almost every Hardware dealer of any note in cities having a population of 500 to 15,000 handles some line of Fencing. We should judge that goods of this character would prove a very satisfactory line to the dealer, as it usually is purchased by progressive farmers who are amply responsible and meet their bills promptly. There is practically no risk of bad accounts, for any person who invests in Fencing usually owns a considerable amount of land. While we believe there are quite a number of dealers who object to handling Fencing by reason of its bulkiness, at the same time there are perhaps an equal number who carry a line of Fence, not only for the profit realized out of same, but also for the opportunities it gives them of becoming acquainted with the progressive and reliable farmers of their section.

Progressive and Reliable Farmers

75 per cent. Sold by Hardware Trade

From a Manufacturer in Illinois: We believe about 75 per cent. of the Woven Wire Fencing sold at the present time is handled by the Hardware trade, more especially those who handle Agriculture Implements as well. A considerable proportion of Fencing is handled by the lumber yards, some companies having 30 and 40 line yards. Fencing is bought from the main office to supply the wants of the different yards.

Strictly in the Hardware Line

From a Manufacturer in New England: As it is the policy of nearly all Woven Wire Fence manufacturers to sell their product on the agency plan, practically all the Field Fencing is sold by the Hardware trade, this article being strictly in their line. Poultry Fencing is, of course, a little different proposition, and while all the Hardware dealers handle the bulk of it, the seed trade houses distribute considerable. While, of course, there are many Hardware dealers who have not yet taken on Woven Wire Fencing, we do not hesitate to say that the most progressive have, and it is only a matter of time when every Hardware dealer will handle it wherever there is a demand.

Direct to the Retail Merchant

From a Manufacturer in Illinois: The most successful way of handling Woven Wire Fencing seems to be for the manufacturer to sell it direct to the retail trade, appointing a retail man as his agent to sell the Fencing to the farmer. We have understood that the jobbing trade have tried to handle Fencing, but with varying success. There seems to be something very peculiar in the Fence business which is inherent in itself, and it necessitates the manufacturer getting as close as possible to the consumer if he expects to make a success in marketing his product.

Merchants Made Special Agents

From a Manufacturer in Indiana: Wire Fencing is sold largely through the Hardware trade, although it is not confined to this class of trade alone. The styles of Fencing made by the different manufacturers are not sold generally, however, but dealers are made special agents and exclusive sale of Farm Fencing in certain territory is given to them. Farm Fencing is not handled through the jobbing trade. The dealers who represent the different manufacturers carry the lines in stock so that those who will not carry it cannot buy the Fence.

Retailers Sell Two Cars a Year

From a Manufacturer in Iowa: Woven Wire Fence is handled by all Hardware dealers throughout this section of the country and we believe by nearly all in the United States. Most of the dealers through this section buy their Woven Wire Fencing in carload lots and usually sell from one to two cars a year, while a wholesale dealer sells considerably more. Woven Wire Fencing is, the same as Barbed Wire and Nails, a product of the Hardware trade, although there are a great many lumber and Implement firms handling Woven Wire Fencing, but the greater portion of it is sold through the Hardware dealer.

Fence Sold to Merchants

From a Manufacturer in Iowa: Ninety-eight per cent. of the Woven Wire Fence in the United States is sold direct to the Hardware trade. In other words, the manufacturers themselves sell their entire product to the Hardwareman. They do not make him an agent. He is a buyer of this class of goods, the same as he is in Nails or other merchandise of similar character. There are, however, four or five concerns who are running a mail order business, selling direct to the consumer, but of course this percentage of business is small and does not affect the manufacturers to any extent.

Fence Agents Driven Out

From a Manufacturer in Michigan: Up to about ten years ago comparatively few Hardware dealers handled Fencing, except in the West, where previous to that time the Hardware and Implement trade got to dealing in it quite extensively. Merchants generally, not wanting to undertake the erection of the Fence, preferred not to handle it; but with the advent of the larger producers of Field Fence and much greater competition, as well as the more general use of Wire Fencing, nearly every one expects to put up his own Fence, and Wire Fencing is now strictly a dealer's proposition, and in most cases the Hardware dealers sell Fencing. Another condition has done away to quite an extent with the Fence agent and is in favor of the regular dealer. Like all new things, a few years ago Fencing was sold on very large margins and required special work in the country to sell it. Now margins have got down on a sensible basis both for the manufacturer and the dealer, and we believe that there is no cleaner proposition for the dealer, particularly in a country town, than a good line of Fencing.

Inferior Goods Sold Direct

From a Manufacturer in Iowa: Woven Wire Fencing is handled by Hardwaremen, lumber and Implement dealers all over the West. The goods are generally sold to one dealer in a town, giving him the exclusive handling, owing to the fact that there are so many patents and designs. A large amount of goods, however, is sold straight to the farmer by the manufacturer. This class of goods is as a rule inferior in every respect, and the farmer or consumer finds out in the end that he has paid fully as much for his Fencing as the price he could buy it at from his local dealer, weight of the product and all considered. Some of the inferior products are handled through the catalogue houses. We do not find much competition from the catalogue houses or the manufacturers who sell the farmer straight in this country, however, as the consumer gets bit nearly every time he buys goods from these people.

Magnitude Just Realized

From a Manufacturer in Indiana: Our goods are handled through special agents in almost every instance, but we know through other Fence manufacturers that the dealers are handling perhaps two-thirds of the Fence business to-day. We have applications every day from dealers to handle our Fencing, but it is contrary to our plan to allow them to sell unless they will comply with all the conditions we impose upon them. Our observation is that the Hardware dealers are just beginning to realize the magnitude of the Fence business and are making an effort to post themselves and secure their portion of it. In one sense we do not believe the dealer is the one to handle Fencing. Ordinarily dealers wish to handle Fencing in the same manner that they would any other article of merchandise when, in our estimation, we think those handling Fencing should be responsible for its erection.

An Essential Requirement

From a Manufacturer in Ohio: Woven Wire Fence is extensively handled by the Hardware trade, but we do not find it advantageous to place the sale of our goods in their hands, as a large percentage of the dealers give the business but little attention, so far as the erection is concerned, which is very essential for satisfactory results. What is known as "Fence agents," who contract and build Fence, the same as the agricultural dealer when starting his business many years ago, are the people we are interesting in placing our goods on the market.

From a Manufacturer in Indiana: Woven Wire Fencing is handled to a considerable extent by the Hardware trade. Field Fencing is usually bought outright and carried in stock. Lawn Fences are sold from catalogues and blue prints, each Fence being constructed especially for each individual job. A great many of the Hardware

dealers act as agents for the manufacturer, others buying of any who will quote the lowest price on the goods. If the Hardware merchants will stand by those manufacturers who protect them and give them the benefit of a low price so they can sell at a fair margin of profit it would benefit both the dealer and manufacturer and have a tendency to improve the quality of the goods and raise the prices. There is a tendency in many of the large cities to go back to Fences again, while in the small towns and rural districts there is a constantly increasing demand for a good grade of Fencing. It is therefore up to the dealer to keep this market in good condition and maintain prices, thereby assisting the manufacturer in turning out a high grade of goods.

Mutual Benefit

From a Manufacturer in the East: The subject of Wire Fencing is a somewhat complicated one and we do not know of any territories where any opinion which we may have or any advice which we may offer would apply with equal force. The most popular brands of Fencing are handled exclusively by local agents. Other brands are placed in the hands of Hardware jobbers. Some of the smaller manufacturers advertise and sell direct to the consumer. Therefore it is obvious that the condition confronting the jobber on Wire Fencing is very unsatisfactory, and such as would cause him no end of trouble. Unless he is able to secure a popular brand, having an exclusive agency in certain territory, we do not believe that it is possible for him to secure a satisfactory profit or that it would pay him to handle Wire Fencing.

Not Favorable to Jobbers

From a Manufacturer in Michigan: About 60 per cent. of our agents are Hardware merchants. We find that most of the Hardware merchants are ready to take on a line of Fencing.

From a Manufacturer in Wisconsin: Judging from our own experience at least 75 per cent. of the Woven Wire Fence at present manufactured is handled by the Hardware trade, who are usually given the exclusive sale for the leading styles of Fencing. The rule adopted by most fence manufacturers is to sell to but one merchant in each town, thus making it an object to build up a trade and push the business on that particular Fence.

From a Manufacturer in Michigan: About 30 per cent. of our agents handle Fence in connection with the Hardware business. The Fence is mostly sold to Implement dealers who canvass for Farm Implements and carry the Fence in connection therewith. Hardware merchants as a general thing do not have canvassers on the road for their line unless they happen to carry an extensive line of Implements as well.

From a Manufacturer in Illinois: It is our experience that the Hardware trade is taking up the sale of Woven Wire Fencing quite largely. A few years back but a very few Hardware concerns handled the line, but a large majority of them handle one make or another of Woven Wire Fence now.

From a Manufacturer in Illinois: Fully 90 per cent. of our Fence is handled by Hardwaremen. The balance is sold through lumber dealers and general store keepers. We believe that the time is coming when every Hardware merchant in the country will be compelled to carry a line of Woven Fence of some description.

From a Manufacturer in Michigan: Nearly all Hardware dealers not only sell Wire Fencing, but most of them carry it in stock.

From a Manufacturer in Illinois: Woven Wire Fencing seems to be with 80 per cent. of the Hardware merchants in the West as standard stock as Nails, and almost all factories making this line of goods are getting in position to furnish their customers promptly.

From a Manufacturer in Missouri: This class of goods is usually placed by the manufacturer with one concern only in a place and not as a rule carried in stock by Hardware jobbers.

From a Manufacturer in Illinois: Woven Wire Fencing is handled largely by the retail Hardware trade, but absolutely through the agency plan. No two Fences are sold on the same list or discount because they are all of different styles and grades and there is practically no direct competition in the Fencing business. Each Fence has its own merits.

From a Manufacturer in Michigan: As far as our experience goes we find our best customers among the Hardware and Implement dealers. In fact, they are the only kind of trade that we cater to, as it is our opinion that the Fence business should be handled in Hardware and Implement stores.

From a Manufacturer in Ohio: We are of the opinion generally that Wire Fencing is handled to a large extent through the Hardware dealer and that the dealers represent the manufacturers direct. It has been the custom that when a dealer can buy in car lots he is quoted bottom prices. We do not know of Fencing being handled by jobbers in this vicinity. Our product is sold principally to the farmer and through farmer agents. However, we have some Hardware dealer agents who are handling our product very satisfactorily. We give them exclusive territory and fully protect and quote them our very lowest prices.

From a Manufacturer in Indiana: We have watched this matter very closely and in our opinion 50 to 60 per cent. of all the Fence sold is sold through the Hardware dealers. We find that the dealers are now generally handling Woven Wire Fence. Up to a year or two ago the greater part of the Fence sold was disposed of direct to the consumer.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our catalogue department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

GEORGE H. STEGE, Brooklyn, N. Y.: Folder, entitled "An Illumination Like Daylight," referring to the Bell Single Burner Gas Arc.

CLEVELAND RUBBER WORKS of the Mechanical Rubber Company, Cleveland, Ohio: Catalogue of Belting Packing, Hose, &c.

HOME RUBBER COMPANY, Trenton, N. J.: Catalogue of Belting, Packing, Rubber and Cotton Hose, Molded Rubber Specialties, &c. Special attention is called to N. B. O. Black Sheet Packing and O. I. M. High and Low Pressure Wedge Packing.

POWERS & WILLIAMS, Streator, Ill., are sending out a postal circular the subject of which is "Our Special Proposition," in regard to Sterling Steel Carpet Sweepers. This has reference to an assortment of the Sweepers on which prices are mentioned and with which a steel revolving stand is given free.

A CONSOLIDATION has been effected embracing the Animal Trap Company, Abingdon, Ill., and the J. M. Mast Mfg. Company, Lititz, Pa. The new company, which has a capital stock of $150,000, will be known as the Animal Trap Company and will be under the management of F. W. Schultz, president. A new building now in process of erection at Lititz will probably be ready for occupancy in the spring. It will be equipped with modern machinery and the line of Traps will be considerably enlarged.

BALDWIN & ROBBINS COMPANY.

THE business of the well-known Hardware jobbing house of Baldwin, Robbins & Co., Boston, Mass., will after January 1 be conducted by Baldwin & Robbins Company, a corporation already formed under Massachusetts laws, with a paid in capital of $150,000. Following are the officers of the new company: President, A. H. Decatur; treasurer, W. A. Hopkins; directors, Messrs. Decatur and Hopkins and Thomas H. Baldwin and John H. Robbins. Mr. Baldwin and Mr. Robbins retire from active participation in the business, except as directors and stockholders. The management therefore will continue as it has practically been for the past few years in the hands of Messrs. Decatur and Hopkins, who are both well known to the trade, the former having been connected with the concern since 1887 and the latter since 1894. The new corporation succeeds to a business established by Flint & Carter in 1846, which has continued without interruption ever since and with a steady growth.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

REQUESTS for catalogues, price-lists, quotations, &c., have been received from the following houses, with whom manufacturers may desire to communicate.

FROM BEALL & WILLAMS, who have bought the Hardware, Saddlery and Carriage business of Freeman & Mendenhall, Snyder, Okla.

FROM HOLLOWAY, STANARD & KNAPP, Brownsville, Ore., who have succeeded Holloway & Webber in the Hardware and Undertaking business.

FROM J. L. CASTLE & Co., Dayton, Ore., dealers in Shelf and Heavy Hardware, Stoves, Implements, Paint and Sporting Goods.

FROM GEORGE J. DODGE & SON, River Falls, Wis., successors to George J. Dodge.

FROM CHATTANOOGA BROKERAGE COMPANY, P. O. Box 384, Chattanooga, Tenn. The company does a manufacturers' agency business in Hardware Specialties, covering the Southern States, and desires catalogues and quotations.

FROM SEMINOLE HARDWARE COMPANY, Wewoka, I. T., who are in the market for Well Machinery and Supplies for Oil and Gas Wells.

FROM RONALD & FISKE, Cocoa, Fla., who have just erected a new building and will make a specialty of Boat Hardware, Marine Engines, Automobile and Bicycle Supplies, Lubricating Oils, &c.

FROM REBER & FISHER, Lewisburg, Pa., who have recently embarked in the retail Shelf and Heavy Hardware, Paint, Plumbing, steam fitting and roofing business. Mr. Reber was formerly a traveling salesman for the W. Bingham Company of Cleveland, Mr. Fisher having been in the plumbing business in Lewisburg for the past 15 years.

THE statement of condition November 21 presented at the recent quarterly meeting of the directors of the Minnesota Retail Hardware Dealers' Mutual Fire Insurance Company shows total assets of $65,528.75, an increase during 1905 of $17,494.02, and net surplus $42,662.13, an increase during 1905 of $10,842.78. The return premium on policies expiring in 1906 will be 40 per cent.

Wood & Hill, dealers in Hardware, Implements, Harness, &c., at Modena, Mo., have been succeeded by H. T. Hill.

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AN EFFICIENT INVENTORY SYSTEM.

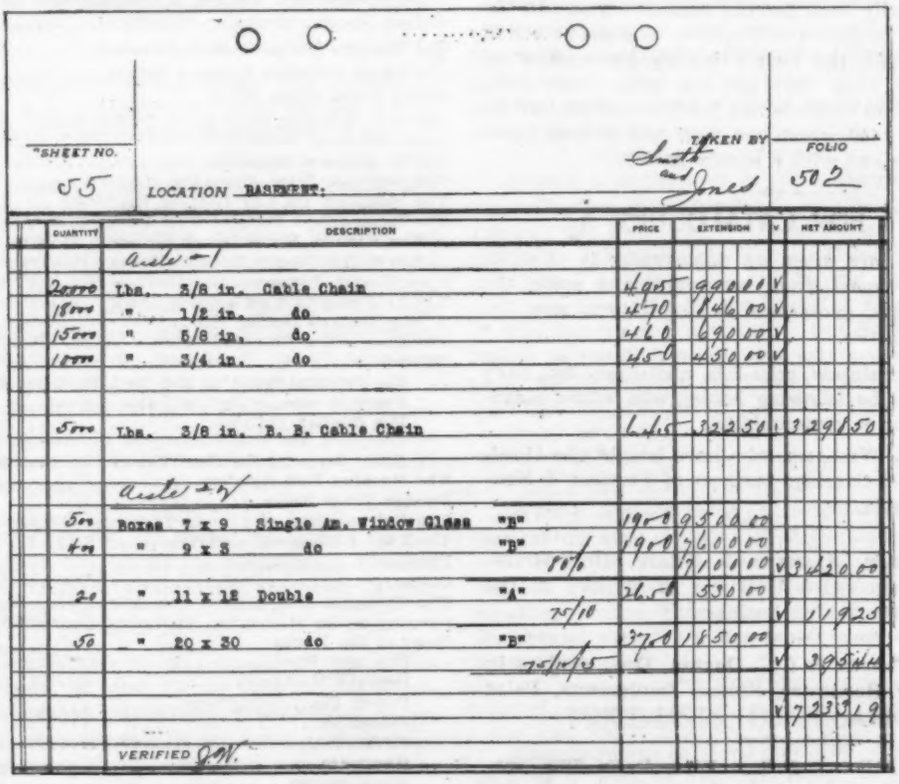
BY courtesy of the jobbing house of Emery-Waterhouse Company, Portland, Maine, we are furnished with a description of the inventory system which has been perfected by that concern. While necessarily comprehensive and workmanlike to meet the requirements of a large business the system is entirely practicable for a Hardware stock of any size.

Preparation for Inventory

includes the arrangement of goods to facilitate the work by counting and labeling quantities as far as possible. tory sheets are numbered and registered so that the omission of any would be immediately discovered when they were returned to the office.

The Writing of the Sheets

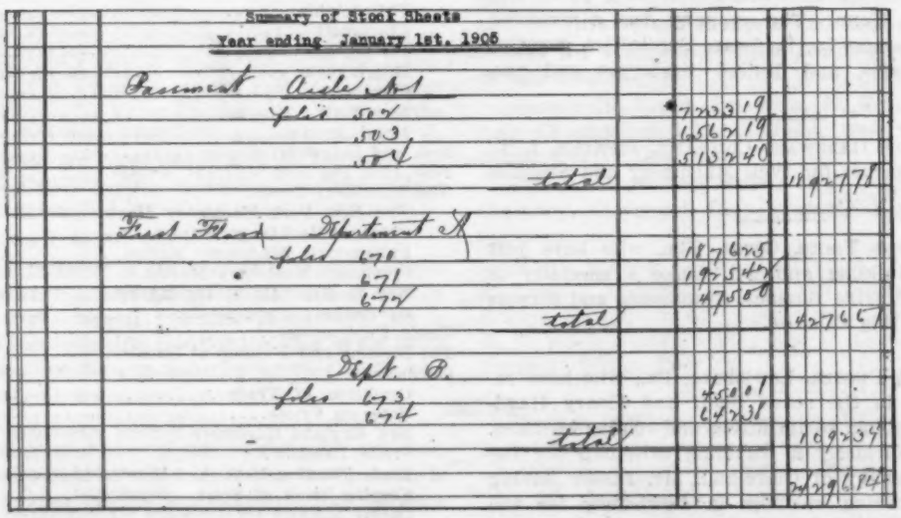
is fully explained by the columns and printed headings shown in Fig. 1. This is a reproduction of an inventory sheet entirely filled out, except, of course, that the quantities, prices and discounts are fictitious. In the check column a check against an extension or a net amount indicates that the figuring has been examined, while "verified" at the foot of each sheet, as shown in Fig. 1, is filled in with the initials of a member of the firm and



"SHEET NO." 55 — LOCATION BASEMENT: — TAKEN BY Smith and Jones — FOLIO 502

QUANTITY	DESCRIPTION		PRICE	EXTENSION	✓	NET AMOUNT
	Aisle No 1					
20000	lbs. 5/8 in. Cable Chain		4 05	990 00	✓	
18000	" 1/2 in. do		4 70	846 00	✓	
15000	" 5/8 in. do		4 60	690 00	✓	
10000	" 3/4 in. do		4 50	450 00	✓	
5000	lbs. 3/8 in. B. B. Cable Chain		6 45	322 50	✓	3291 50
	Aisle No 2					
50	Boxes 7 x 9 Single Am. Window Glass	"B"	1900	95 00 00		
40	" 9 x 8 do	"B"	1900	76 00 00		
		10%		171 00 00	✓	3420 00
20	" 11 x 12 Double	"A"	26 50	530 00		
		75/10			✓	1 1925
50	" 20 x 30 do	"B"	3700	1850 00		
		75/10/5			✓	3955 44
					✓	7237 19
	VERIFIED JW.					

Fig. 1.—Part of Inventory Sheet, Filled Out.—Actual Dimensions, 9½ x 14 Inches.



Summary of Stock Sheets
Year ending January 1st. 1906

Basement Aisle No 1
folio 502 — 7237 19
503 — 1656 71
504 — 5132 40
total — 14026 30

First Floor Department K
folio 670 — 1876 25
671 — 1954 75
674 — 475 00
total — 4276 00

Dept. B.
folio 673 — 4500 01
674 — 6431 31
total — 10931 32

— 29233 62

Fig. 2.—Part of Grand Summary Comprising Totals of Inventory Sheets.—The Asterisk (*) Denotes Entry of Sheet Illustrated in Fig. 1.

Each man in the store attends to the section or floor for which he is permanently responsible. In the office typewritten inventory sheets covering many lines of stock are prepared in advance as the typewriters have opportunity, so that the final work is reduced merely to filling in the quantities. This insures clearness, neatness and uniformity in a large proportion of the sheets, and the balance which are written by hand can be readily copied on the typewriting machine if desired before they are priced and extended. Prior to distribution among the crews into which the force is divided for stock taking all inven- denotes approval of the inventory costs on the sheet. As each crew writes up its allotted stock

Sheets Are Returned to the Office,

where they are immediately priced, extended and examined so that the entire stock is ready for summarizing as soon as the inventory is completed. The filling in of "Location" and "Sheet No." permits of the assembling of all sheets in accordance with the arrangement of stock, shelf following shelf consecutively and aisle following aisle. Under this plan, if any part of the store should be damaged by fire, by referring to inventory the

stock value of such part could be determined immediately. After being assembled and arranged as described, the sheets are bound in a loose leaf permanent binder. No amounts are carried forward, but the totals of all sheets are brought together in the

Grand Summary

a portion of which is illustrated in Fig. 2. This summary, by reason of the method of assembling, admits of a subdivision of additions, so that the total stocks of various departments can be seen at a glance. Being entirely independent of the stock sheets, the summary can be separately filed where it is accessible only to those having a right to knowledge of the total inventory.

INVENTORY METHODS IN BRIEF.

The following extracts from letters stating briefly the inventory methods of representative Hardware Merchants contain much that is interesting and suggestive:

Eight or Ten Books with Ledger Ruling.

From a Merchant in Ohio: We use about eight or ten different books with ledger ruling and take our inventory in these without transcribing, which has been a very satisfactory mode of doing it for us.

Do Not Use Any Special Blanks.

From a Merchant in New Mexico: We have one man go ahead and do the counting and two follow up, calling off and putting down in the stock book. We do not use any special blanks for inventory, but get through as accurately and rapidly as circumstances will allow. Usually two days and a half are required to take a $6000 stock. We measure the iron on the iron rack. This saves time and labor both.

Well Satisfied with His Method.

From a Merchant in Minnesota: I have for years used sheets which I procure from my jobber at a very nominal figure, and have a binder into which I file them when completed. This binder I also bought from the jobber for a moderate sum, and I am so well satisfied with this arrangement that I have not thought of looking further in this line. The binder is large enough to hold several years' inventory if one desires and is of such size and shape that it is readily placed in an ordinary safe.

Loose Leaf System Preferred.

From a Merchant in New York State: We have used no special blanks for taking inventories. The best thing we know of is the loose leaf system, as it is easier to classify. We carry our business under four divisions—viz.: Hardware, Plumbing, Heating and Tin Work, and Photography.

Stock Divided Into Departments.

From a Merchant in Connecticut: We use a blank form of inventory sheet which we have found very satisfactory. We divide our stock into departments, numbering the slips, and as soon as the slips are filled out they are brought into the office, priced and figured, and are then placed in a substantial binding which comes for this purpose.

An Old but Satisfactory Method.

From a Merchant in Minnesota: Our method is an old one, yet the best we have tried—that is, we furnish the clerks with loose sheets snapped on to a piece of stiff pasteboard with a spring clothes pin, each sheet being numbered, so that the bookkeeper can copy it in the invoice book, keeping each floor and each side of a room by itself, so that we can easily look up any article during the year, tracing its location by the index in the invoice book. In this manner the invoice book is clean, easily read, and in good form to keep in safe and to present to the insurance adjuster in case of a fire.

Salesroom, Basement, &c.

From a Merchant in Iowa: We use only one side of the sheet. We invoice in departments—that is, we put our inventories under various headings, such as main salesroom, wareroom first floor, wareroom second floor, basement, tinner's shop, &c. After completing the inventories we take the sheets to a binder and have them bound in pasteboard covers.

No Special Blanks Used.

From a Merchant in New Hampshire: We do not use any special blanks for inventory, taking down the stock in ordinary books with pencils and blocking it off in sections, also keeping the different departments separate, such as the Sporting Goods, Heavy Hardware, Paints, Oils, Varnishes, &c.

Blanks Turned Into Office Each Day.

From a Merchant in Maine: We use for stock taking a loose leaf 8½ x 12 inches, using both sides, and at the end of the day each man who has been writing passes his blanks into the office, where they are put into a loose leaf binder.

A Blank Book for Each Department.

From a Merchant in Michigan: We do not use any special blanks in taking annual inventory. We use small blank books for each department in our business, measuring 3½ x 6 inches, which we find very convenient.

A Stock Form Used.

From a Merchant in Iowa: We have no special form of invoice blanks, as we use a stock form. We find this the most convenient way, as we can have several parties do the writing and the invoice can then be assembled without recopying. All the pricing and figuring is done on the original sheet.

Separate Sheets Not Approved.

From a Merchant in New Mexico: We do not use separate sheets in our stock taking. Have found an ordinary book much better, at least for us, than loose leaf.

Blank Book for Each Department Head.

From a Merchant in Michigan: We have no special blanks that we use in inventory. We give a suitable sized blank book to each one of the heads of departments, and when through these are collected and bound in one.

Ordinary Charging Sheets Employed.

From a Merchant in Pennsylvania: We have been using ordinary charging sheets for taking our inventory, which we find to be as convenient as any special form we have as yet seen.

A Good Substantial Book Used.

From a Merchant in New York State: We do not use any special blanks in taking our inventory. We write it in ink in a good substantial book as we take it, keeping the different rooms and sections of the stock separate.

No Special Blanks.

From a Merchant in Iowa: We have no special blanks for inventory purposes. An ordinary blank book, ruled with double money columns, fills every want.

Ordinary Blank Pads.

From a Merchant in Wisconsin: I have no special blanks for taking inventory. I take off my inventory on ordinary blank pads, keeping each department and goods of a kind together, and after same is all completed I copy it into an inventory book to keep in the safe.

Loose Leaves Numbered Consecutively.

From a Merchant in New York State: In taking our annual inventory we use a simple loose leaf system. The leaves are of a convenient size, ruled in two columns and perforated for binding on the left hand side in the usual manner. These blanks are supplied to the different crews and are filled in, being numbered consecutively as they are completed and turned in to the office to be priced and figured. When all of the stock has been taken and the various sheets completed they are put into a binder in order as the stock runs, thus forming a permanent book in convenient shape for reference during the year.

Ruled Sheets.

From a Merchant in North Dakota: We buy ruled sheets in quantities and as we turn them over to the clerks who take stock each one is numbered consecutively, so we have a record of all sheets that leave the

office. Our different clerks take various parts of the stock, and when complete these sheets are all bound in one book and filed away.

Sheets Arranged as Per Location of Stock.

From a Merchant in Maine: Inventory sheets are numbered at the bottom and registered when given out to each clerk, so as to avoid loss. The clerks have spring-back holders for the sheets, and all are turned in every night. After inventory is completed sheets are arranged according to location of stock and numbered at the top. We do not carry forward the footings, but transfer each to another sheet.

AMONG THE HARDWARE TRADE.

H. E. Beeler, Ottawa, Kan., has sold his Hardware, Plumbing and Heating business to A. P. Elder, who has added a line of appliances and fittings for burning natural gas, which has just been introduced into the city.

L. E. Peterson has purchased the stock of Wendt & Sorenson, Hutchinson, Minn., and will continue the business.

Charles Ross has retired from the Hardware firm of the James Ross Company, 859 Racine street, Milwaukee, Wis. His interest in the business is taken by his son, James Ross.

Mell B. Talmage has disposed of his Hardware business at Mt. Gilead, Ohio, to Wilson & Mathews, who continue at the old stand. Mr. Talmage is now purchasing agent for the Hydraulic Press Mfg. Company of Mt. Gilead.

Bozarth & Featherby, Hardware merchants, Yarmouth, Iowa, have been succeeded by W. S. Bozarth. The lines carried embrace Shelf and Heavy Hardware, Agricultural Implements, Buggies and Wagons and Harness.

C. A. Berry has retired from the Hardware and plumbing firm of Peterson & Berry, Wayne, Neb., and the business is now being conducted under the style of Marstelles & Peterson.

Peterson & Son is the style of a new firm at Moorland, Iowa, carrying a stock comprising Shelf and Heavy Hardware, Stoves and Tinware, Paints and Sporting Goods.

The R. C. Newell Company has recently opened up in the Shelf and Heavy Hardware, Agricultural Implement, Sporting Goods and Plumbing business at Franklin, Mass.

The Leader Hardware Company has purchased the business of the Parkston Land & Implement Company, Parkston, S. D.

The stock and building of the Cushing Hardware Company, Cushing, O. T., was recently damaged by fire to the extent of $650.

A. F. Comings has succeeded Riley & Laning in the Hardware, Stove and Furniture business in Mt. Sterling, Ill.

The Rosholt Hardware Company has purchased the Hardware business of Wilson & Eklund at Haloock, Minn. The stock includes Shelf and Heavy Hardware, Stoves and Tinware, Paints, Oils and Sporting Goods.

Pomeroy Hardware & Implement Company, Pomeroy, Wash., has bought out the business of the Crescent Hardware store in that place.

The Hardware business at Huntington Beach, Cal., formerly owned by John Gillespie and later by V. E. Phelp, has now been taken over by the Huntington Beach Hardware Company, in which F. C. Spradling and V. E. Phelp are stockholders.

Combination Pliers.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York, has recently put on the market a combination plier which is an adaptation of its regular Button's plier to driving purposes by the addition of a hammer head for driving staples, &c. Another feature of the tool is the positive stop on each of the two parts, so that in opening the Button wire cutters stop at the proper position for inserting wire to be cut. It is made in 8-inch size and natural black finish, No. 91.

Gerner Continuous Ice Cream Freezer.

The Gerner Freezer & Mfg. Company, Niagara Falls, N. Y., is building a patent continuous ice cream freezer which is illustrated herewith. The reservoir on the right into which the liquid cream is poured contains a beater to beat the cream, and if freezing fruit cream to stir up the mass and keep fruit from settling to the bottom. This can also be used independently of the freezer for whipping cream. On the left is the ice or

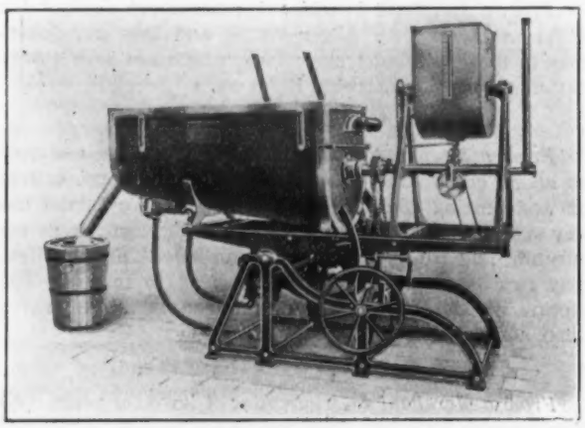


Fig. 1.—Gerner Continuous Ice Cream Freezer.

brine box to contain the freezing agent. If brine is used it is fed through flexible pipes into the front or smaller end of the box, rises to the top and overflows at the rear pipe, returning to the brine tank. The cream is automatically fed from the reservoir through a hollow shaft into the can, which turns in the ice or brine box. Inside the can and turning in an opposite direction is the dasher shown in Fig. 2. At one end of the dasher are small cross bars which whip up the cream as it is received into the can, passing it on as it gets harder and harder until it is discharged from the freezer by the worm screw at the other end of the dasher. The automatic valve at the reservoir is set by the operator to feed the cream into the machine as fast as it can be frozen by the freezing agent. The action of the latter depends on the temperature of the stock cream before frozen and on the temperature of the box, as shown by thermometers at either end. The flavor of the cream can readily be changed without stopping the machine. This freezer will turn

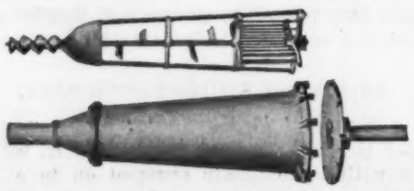
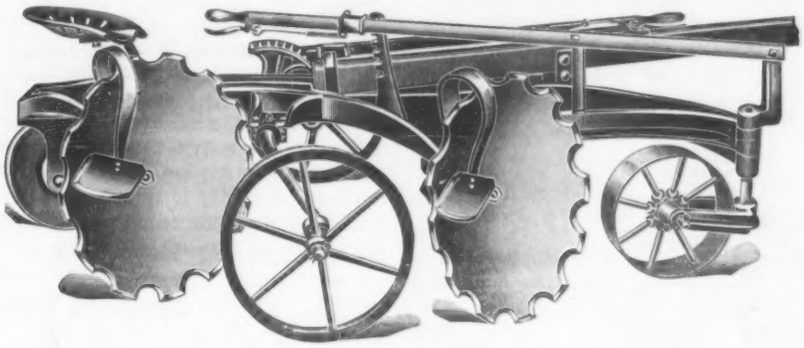


Fig. 2.—Dasher and Can of the Gerner Freezer.

out ice cream continuously as long as the reservoir is kept supplied at the rate of 70 to 90 gallons per hour. It is claimed to be perfect in construction and operation, producing a maximum of cream at a minimum of expense. The machine can be used as a milk or cream cooler by stopping either can or dasher and running the other slowly, while the liquid is allowed to run through. The freezer now being built is intended expressly for the wholesale ice cream trade. Another size is being designed which will serve the smaller dealer or may be used in restaurants, hotels and at home.

Clark's Two-Gang Right Hand Disk Plow.

The accompanying cut represents two and three gang right hand disk plows. The two-gang weighs 600 pounds and the three-gang not far from 800 pounds. They are



Clark's Two-Gang Right Hand Disk Plow.

turning plows, designed for use in all stubble, light sod and fallow land. The two main carrying wheels, together with the oscillating front carrying wheel, lift and carry the entire weight of the earth. The two and three gang plows have the same carrying wheels. They plow a furrow 5 to 9 inches deep and 12 inches wide, and the plows are referred to as very light draft. The oscillating front carrying wheel allows the plow to turn easily at right angle on the corner. It is pointed out that the plows form no plow crust and that the guard wheel prevents all side draft. The plows are being offered by the Cutaway Harrow Company, Higganum, Conn.

Cornice and Tile Setters' Hammers.

The David Maydole Hammer Company, Norwich, N. Y., and 155 Chambers street, New York, in charge of

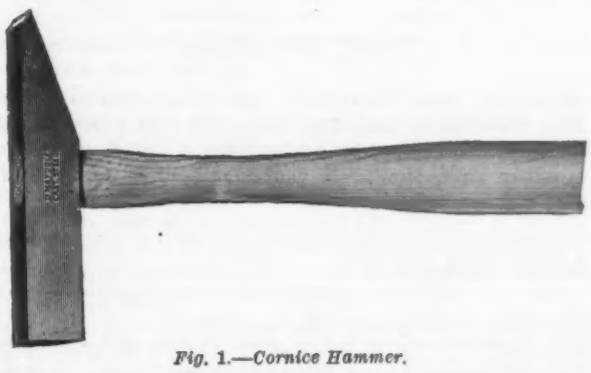


Fig. 1.—Cornice Hammer.

Willis Simpson, has added two new styles of hammers, as here shown. Fig. 1 illustrates a cornice hammer, for use in connection with building cornices. It has a reverse bevel, exactly opposite that of a tinner's setting hammer, which enables the workman to use both ends effectively in cornice and similar work. Both face and point are

Fig. 2.—Tile Setters' Hammer.

of a different temper, and there is a soft center to obviate cracking at the eye if severely used. They are numbered 391 to 395, inclusive, and weigh, not including handle, 24, 20, 16, 12 and 8 ounces each, respectively. The tile setters' hammer somewhat resembles a setting hammer, but has a sharp cutting edge, suitably tempered, for cutting and fitting tiles, the face being perfectly true, so that in setting tiles the individual pieces can be set true to an edge. This hammer is oil finished and made in Nos. 406 and 407, weighing, exclusive of handle, but 4 and 3 ounces each, respectively. These hammers are finely fitted with well proportioned handles of second growth hickory, carefully seasoned naturally, not kiln dried, and all are varnish finished.

Carbon and Milliners' Pliers.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York, has added to an already large line of pliers for innumerable purposes one for electricians in handling arc light carbons and one especially for milliners, as here illustrated. Fig. 1, mil-

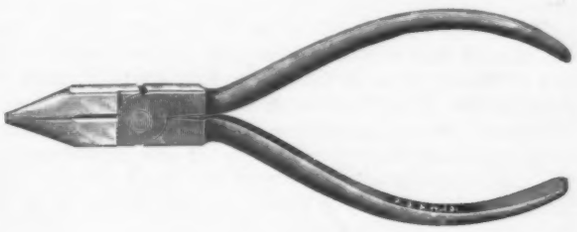


Fig. 1.—Milliners' Pliers.

liners' plier, has a side cutter and strong, short, sharp nose, which tapers to about 1-16 inch from a width of 5-16 inch parallel with the pivot, in a length of ⅝ inch from forward end of cutter. The plier is forged from steel, has a lap joint and is 5 inches long over all, there being three styles of finish, No. 99, black, the side cutter and nose polished; No. 199, nickel plated, and No. 990,

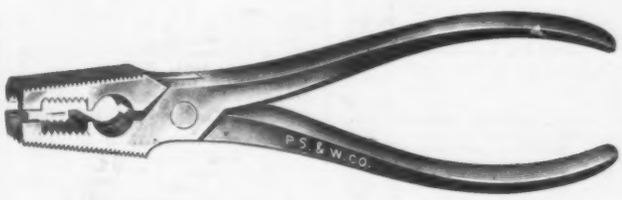


Fig. 2.—Carbon Pliers for Linemen and Electricians.

full polished. This construction enables the operative to twist all kinds of milliners' wire and in otherwise inaccessible places. Fig. 2 illustrates a carbon plier for electrical purposes in taking out and replacing carbons in arc lamps. This plier is 7½ inches long, has polished sides and ends, with a circular opening ½ inch in diameter closed with which to grip the carbon, and by means of the side cutters on each jaw, which have a clear space of ⅜ inch closed, cut the carbon at any desired length. On each outer surface of the jaws is a filing surface of 1½ x 7-16 inch for fitting carbons. In addition to the carbon gripping device there is also an end plier grip for putting on or removing gas burners. The body of the plier is in natural black finish.

The New Brandt Sprayer.

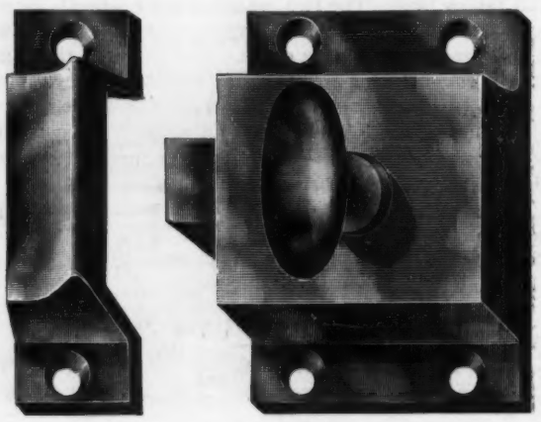
The Heath-Quimby Company, Minneapolis, Minn., is offering the Brandt sprayer, which can be used with a single as well as with a double nozzle, the latter being shown in the accompanying illustration. The sprayer is designed for distributing Paris green, Bordeaux mixture, Paris green and Bordeaux compound, Spanish pink, &c. It can be used for spraying potatoes, tomatoes, tobacco and pineapples; gooseberry,

The New Brandt Sprayer.

currant and rose bushes; cabbage, celery, cucumbers, squash, cauliflower, &c. It is explained that two rows of potatoes can be sprayed at a time as fast as a man walks, and that a row a mile long can be sprayed with one filling of three gallons; also that 15 to 25 hills of potatoes can be sprayed with each stroke of the pump. The chief points of excellence of the sprayer are referred to as follows: That it combines all the advantages of the tank sprayer with those of the hand sprayer and many others; that it is ready for use immediately, as the first stroke of the pump discharges spray from the nozzle at standard pressure, no time being required to pump up a pressure on the tank before commencing work; that a uniform spray is emitted from the nozzle at all times, as the equalizing reservoir at the end of the pump so distributes the air between the nozzle tip and the tank as to maintain a uniform pressure at the nozzle tip at all times; that no air is wasted, as the air that does not pass through the nozzle outlet at the standard pressure is carried through the equalizing reservoir back into the tank, where it serves to maintain a uniform pressure for forcing the fluid to the nozzle; that the spray is emitted from the nozzle in a solid cone, instead of in a whirling hollow funnel, the spray striking over the entire larger outer area of the cone; that the nozzle is so constructed as to emit spray of exactly the proper density, not too light, not too heavy, a result obtained after long experimenting in actual use on the farm of the inventor of the sprayer, and that it is substantially constructed, braces and reinforcements being used wherever there is any advantage to be gained by so doing.

Cupboard Turn.

The Peck, Stow & Wilcox Company, Southington, Conn., and 27 Murray street, New York, has added to its line of builders' hardware the cupboard turn, with



Cupboard Turn, Oval Knob.

oval knob, here illustrated. The illustration is actual size, there being three finishes on the cast iron base, as follows: Old copper, bright bronze and dull brass finish. Another style, similar in character both as to material and finishes, is a cupboard turn with round knob.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	℔ gal.
Linseed, City, raw	40 @41
Linseed, City, Boiled	41 @42
Linseed, State and West'n, raw	37 @38
Linseed, raw Calcutta seed	@62
Lard, Extra Prime, Winter	63 @64
Lard, Extra No. 1	49 @52
Lard, No. 1	38 @40
Cotton-seed, Crude, f.o.b. mills	22½@23
Cotton-seed, Summer Yellow, Prime	28¾@29
Cotton-seed, Summer Yellow, off grades	@..
Sperm, Crude	60 @62
Sperm, Natural Spring	@..
Sperm, Bleached Spring	@..
Sperm, Natural Winter	60 @62
Sperm, Bleached Winter	63 @65
Tallow, Prime	51 @53
Whale, Crude	@..
Whale, Natural Winter	42 @44
Whale, Bleached Winter	44 @48
Menhaden, Brown, Strained	27 @28
Menhaden, Light, Strained	28 @29
Menhaden, Bleached, Winter	30 @31
Menhaden, Ex.-Bld., Winter	31 @32
Menhaden, Southern	16 @16½
Cocoanut, Ceylon	℔ lb 6¼@ 6⅝
Cocoanut, Cochin	℔ lb 8⅛@ 8½
Cod, Domestic, Prime	34 @35
Cod, Newfoundland	38½@40
Red, Elaine	30 @31
Red, Saponified	℔ lb 4¼@ 4⅝
Olive, Italian, bbls	60 @67
Neatsfoot, prime	49 @50
Palm, Logos	℔ lb 6¼@ 6½

Mineral Oils—

Black, 29 gravity, 25@30 cold test	℔ gal. 10½@11½
Black, 29 gravity, 15 cold test	11½@12½
Black, Summer	10½@11½
Cylinder, light filtered	18 @19
Cylinder, dark filtered	16 @17
Paraffine, 903-907 gravity	12½@13
Paraffine, 903 gravity	11½@12
Paraffine, 883 gravity	9¼@ 9½
Paraffine, Red	11½@13

In small lots ½¢ advance.

Miscellaneous—

Barytes:	
White, Foreign	℔ ton $17.50@19.00
Amer. floated	℔ ton 18.00@19.00
Off color, No. 2	℔ ton 13.50@15.00
Chalk, in bulk	℔ ton 3.00@ 3.25
Chalk, in bbls	℔ 100 lb ....@ .35
China Clay, English	℔ ton 11.00@17.00
Cobalt, Oxide	℔ 100 lb 2.50@ 2.60
Whiting, Common	℔ 100 lb .43@ .48
Whiting, Gilders	℔ 100 lb .50@ .55
Whiting, Ex. Gilders	℔ 100 lb .55@ .60

Putty, Commercial—℔ 100 lb

In bladders	$1.65 @1.85
In bbls. or tubs	1.15 @1.35
In 1 lb to 5 lb cans	2.60 @2.90
In 12½ to 50 lb cans	1.45 @1.85

Spirits Turpentine—℔ gal.

In Oil bbls	64½@65
In machine bbls	65 @65½

Glue—

	℔ lb
Cabinet	11 @15
Common Bone	7 @ 9
Extra White	18 @24
Foot Stock, White	11 @14
Foot Stock, Brown	8 @11
German Hide	12 @18
French	10 @40
Irish	13 @16
Low Grade	9 @12
Medium White	14 @17

Gum Shellac—

	℔ lb
Bleached Commercial	38 @39
Bone Dried	48 @49
Button	40 @45
Diamond I	@55
Fine Orange	45 @47
A. C. Garnet	@45
D. C	60 @..
Octagon B	@52
T. N	42 @43
V. S. O	58 @..

Colors in Oil—

	℔ lb
Black, Lampblack	12 @14
Blue, Chinese	36 @46
Blue, Prussian	32 @36
Blue, Ultramarine	13 @16
Brown, Vandyke	11 @14
Green, Chrome	10 @15
Green, Paris	@24
Sienna, Raw	12 @15
Sienna, Burnt	12 @15
Umber, Raw	11 @14
Umber, Burnt	11 @14

White Lead, Zinc, &c.—

	℔ lb
Lead, English white, in Oil	8¼@ 9¼
Lead, American white, in Oil:	
Lots of 500 lb or over	.. @ 7
Lots less than 500 lb	.. @ 7½
In Barrels	.. @ 6½
Lead, White, in oil, 25 lb tin pails, add to keg price	.. @ ½
Lead, White, in oil, 12½ lb tin pails, add to keg price	.. @ 1
Lead, White, in oil, 1 to 5 lb asst'ed tins, add to keg price	.. @ 1½

Lead, American, Terms: For lots 12 tons and over ¼¢ rebate; and 2% for cash if paid in 15 days from date of invoice; for lots of 500 lbs. and over 2% for cash if paid in 15 days from date of invoice, for lots of less than 500 lbs. net.

	℔ lb
Lead, White, Dry, in bbls	.. @ 6½
Zinc, American, dry	4¾@ 5
Zinc, French:	
Paris, Red Seal, dry	9½
Paris, Green Seal, dry	10¾
Antwerp, Red Seal, dry	8¾
Antwerp, Green Seal, dry	10
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over	12¾@13⅜
Lots of less than 1 ton	13⅜@13⅝
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over	11¾@12¼
Lots of less than 1 ton	11¾@12⅜

Discounts.—French Zinc.—Discounts to buyers of 10 bbl. lots of one or mixed grades. 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors—

	℔ lb
Black, Carbon	5 @10
Black, Drop, American	4 @ 6
Black, Drop, English	5 @15
Black, Ivory	16 @20
Lamp, Com	4½@ 6
Blue, Celestial	4 @ 6
Blue, Chinese	29 @32
Blue, Prussian	27 @30
Blue, Ultramarine	4½@15
Brown, Spanish	½@ 1
Carmine, No. 40	$3.50@3.60
Green, Chrome, ordinary	3¼@ 6
Green, Chrome, pure	17 @25
Lead, Red, bbls., ½ bbls. and kegs:	
Lots 500 lb or over	.. @ 7
Lots less than 500 lb	.. @ 7½
Litharge, American, bbls	.. @ 7
Ocher, American	℔ ton $8.50@16.00
Ocher, American Golden	2½@ 3½
Ocher, French	1½@ 2½
Ocher, Foreign Golden	3 @ 4
Orange Mineral, English	10 @12
Orange Mineral, French	10¾@12¼
Orange, Mineral, German	8¼@10
Orange, Mineral, American	8¼@ 8½
Red, Indian, English	4½@ 8½
Red, Indian, American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer.	℔ 100 lb $0.50@1.25
Red Venetian, English	100 lb $1.15@1.75
Sienna, Italian, Burnt and Powdered	3 @ 9½
Sienna, Ital., Raw, Powd	3 @ 6½
Sienna, American, Raw	1½@ 2
Sienna, American, Burnt and Powdered	1½@ 2
Talc, French	℔ ton $15.00@30.00
Talc, American	℔ ton 15.00@25.00
Terra Alba, French	℔ 100 lb 90 @1.00
Terra Alba, English	℔ 100 lb 90 @1.00
Terra Alba, American, ℔ 100 lb, No. 1	70 @80
Terra Alba, American, ℔ 100 lb, No. 2	60 @65
Umber, T'key, Bnt. & Pow	2½@ 3½
Umber, Turkey, Raw & Pow	2½@ 3½
Umber, Burnt, Amer	1½@ 2
Umber, Raw, Amer	1½@ 2
Yellow Chrome	11 @14
Vermilion, American Lead	10 @25
Vermilion, Quicksilver, bulk	@65
Vermilion, Quicksilver, bags	@66
Vermilion, English, Import	75 @80
Vermilion, Chinese	$0.90@1.00

Current Hardware Prices.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer—are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued May, 1905, which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Domestic, ℔ doz. $3.00.....33⅓%
North's 10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent.....35%
Taplin's Perfection.....35%

Ammunition—
See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Eagle Anvils.....℔ lb 6¾@7 ¢
Hay-Budden, Wrought.....9@9¼ ¢
Horseshoe brand, Wrought.....9@9¼ ¢
Trenton .....℔ lb 9@9¼ ¢

Imported—
Peter Wright & Sons.....℔ lb 10½ ¢

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....15&10%

Apple Parers—
See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co.....33⅓%

Augers and Bits—
Com. Double Spur.....75@75&5%
Jennings' Patn., reg. finish.....50&10@60%
Black Lip or Blued.....60&10%
Boring Mach. Augers.....70&10%
Car Bits, 12-in. twist.....50&10%
Ford's Auger and Car Bits.....40&5%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list..25%
No. 30, R. Jennings' list.....40&7½%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15%
Mayhew's Countersink Bits.....45%
Millers Falls.....50&10&7½%
Ohio Tool Co.'s Bailey Auger and Car Bits.....40&10%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....60%
Snell's Car Bits, 12-in. twist.....60&10%
Wright's Jennings' Bits.....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's small, $18; large, $26.....50&10%
Clark's Pattern, No. 1, ℔ doz. $36; No. 2, $18.....65%
Ford's, Clark's Pattern.....60&5%
C. E. Jennings & Co., Steer's Pat..25%
Swan's 60%

Gimlet Bits—
Per gro.
Common Dble. Cut....$3.00@3.25
German Pattern, Nos. 1 to 10, $4.60; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz..$5.50@6.00
Ames .....25&10%
Universal 30%
Wood's Universal.....25%

Ship Augers and Bits—
Ship Augers.....45&5@60%
Ford's .....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's 15%
Watrous' .....35&5%
Ohio Tool Co.'s.....40%
Snell's 40%

Awl Hafts—
See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled .....gro. $2.75@3.00
Unhdled, Shldered..gro.63@66¢
Unhandled, Patent..gro.60@70¢
Peg Awls:
Unhandled, Patent..gro. 31@34¢
Unhdled, Shldered..gro. 65@70¢
Scratch Awls:
Handled, Com...gro. $3.50@4.00
Handled, Socket..gro.$11.50@12.00
Hurwood 40%

Awl and Tool Sets—
See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights:
First Quality.....$6.75
Second Quality.....$6.25
Double Bit, base weights:
First Quality.....$9.00
Second Quality.....$8.50

Axle Grease—
See *Grease, Axle*

Axles—
Iron or Steel
Concord, Loose Collar...4¼@4¾¢
Concord, Solid Collar...4¾@5¼¢
No. 1 Common, Loose...3¼@3¾¢
No. 1½ Com., New Styles3¾@4¼¢
No. 2 Solid Collar.....4@4½¢
Half Patent:
Nos. 7, 8, 11 and 12....75@75&5%
Nos. 13 to 14.....70&10@75&5%
Nos. 15 to 18...75&10@75&10&5%
Nos. 19 to 22...75&10@75&10&5%

Boxes, Axle—
Common and Concord, not turned lb., 4½@5¢
Common and Concord, turned. lb., 5½@6¢
Half Patent.....lb. 8½@9¢

Bait—
Fishing—
Hendryx:
A Bait.....20%
B Bait.....25%
Competitor Bait.....20&5%

Balances—
Sash—
Caldwell new list.....50%
Pullman .....50&10@60%

Spring—
Spring Balances.....50&10@60%
Chatilon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%

Barb Wire—
See *Wire, Barb.*

Bars—
Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 3@3¼¢

Towel -
No. 10 Ideal, Nickel Plate..℔ gro. $2.50

Beams, Scale—
Scale Beams.....40&10@50%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ℔ doz. $0.85; Tinned $1.00
No. 11 Wire Coppered ℔ doz. $1.10; Tinned $1.20
No. 10 Wire Galvanized..℔ doz. $1.75
Western W. G. Co.:
No. 1 Electric.....℔ gro. $7.80
No. 2 Buffalo.....℔ gro. $9.00
No. 3 Perfection Dust.....℔ gro. $8.00

Egg—
Holt-Lyon Co.:
Holt, No. A, Japanned....℔ doz. $1.20
Holt, No. 1, Tinned.....℔ doz. $1.50
Holt, No. B, Japanned....℔ doz. $2.00
Holt, No. 2, Tinned.....℔ doz. $2.25
Lyon, No. 2, Japanned....℔ doz. $1.25
Lyon, No. 3, Japanned....℔ doz. $1.50
Taplin Mfg. Co.: ℔ gro.
No. 60 Improved Dover.....$6.00
No. 75 Improved Dover.....$6.50
No. 100 Improved Dover.....$7.00
No. 102 Improved Dover, Tin'd..$8.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd.$17.00
No. 200 Imp'd Dover Tumbler.....$8.50
No. 202 Imp'd Dover Tumbler, T'd.$9.50
No. 300 Imp'd Dover Mammoth, ℔ doz. $25.00
Western, W. G. Co., Buffalo.....$7.00
Wonder (S. S. & Co.).℔ gro. net, $6.00

Bellows—
Blacksmith, Standard List.. 60&10@70&10%

Hand—
Inch.. 6 7 8 9 10
Doz...$4.75 5.70 6.65 7.60 8.85

Molders—
Inch.. 9 10 11 12 14
Doz...$8.00 9.00 10.50 12.50 14.50

Net Prices.

Bells—
Cow—
Ordinary goods...75&5@75&10&5%
High grade.....70&10@70&10&5%
Jersey .....75&10%
Texas Star.....50%

Door—
Abbe's Gong.....45%
Burton Gong.....50%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's...60&10&10%
Trip Gong.....50&10@50&10&5%
Yankee Gong.....55%

Hand—
Hand Bells, Polished, Brass.. 60&10@60&10&5%
White Metal.....60%
Nickel Plated.....50&10&60%
Swiss .....60@60&7½%
Cone's Globe Hand Bells.....33⅓@35%
Silver Chime.....33⅓@35%

Miscellaneous—
Farm Bells.....lb. 2¼¢
Steel Alloy Church and School 50&10@60%
American Tube & Stamping Co. Gongs 75%
Table Call Bells.....50@50&10%

Belting—
Leather—
Extra Heavy, Short Lap..60&65%
Regular Short Lap....60&10&5%
Standard 70%
Light Standard.....70&5%
Cut Leather Lacing.....60%
Leather Lacing Sides, per sq. ft. 22¢

Rubber—
Agricultural (Low Grade)..... 75@75&5%
Common Standard....70@70&10%
Standard .....60&5@60&10%
Extra .....60@60&5%
High Grade.....50&5@50&10%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters 20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $4.25; No. 2, $7.25; No. 3, $10.50; No. 4, $16.25; No. 5, $20.50.

Bicycle Goods—
John S. Leng's Son's 1902 list:
Chain 50%
Parts 50%
Spokes 50%
Tubes 60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks—
Tackle—
Common Wooden....70&10@75%
Hartz St. Tackle Blocks.....50@50&5%
Hollow Steel Blocks, with Ford's Patent Sheaves.....50&10%
Lane's Patent Automatic Lock and Junior 30%
Stowell's Novelty, Mal. Iron....50&10%
Stowell's Self Loading.....60%
See also Machines, Hoisting.

Boards, Stove—
Zinc, Crystal, &c....30&10@40&10%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co.....33⅓%

Bolts—
Carriage, Machine, &c.—
Common Carriage (cut thread): ⅝ x 6 and smaller.....75@—%
Larger and Longer...65&5@—%
Phila. Eagle $3.00 list May 24, '99 80%
Bolt Ends, list Feb. 14, '95.... 65&10@—%
Machine, ⅝ x 4 and smaller 75@—%
Machine, larger and longer.. 65&10@—%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knob:
Inch..... 3 4 5 6 8
Per doz..$0.30 .35 .45 .60 .80
Cast Iron Spring Foot, Jap'd:
Inch..... 6 8 10
Per doz.....$1.20 1.50 2.25
Cast Iron Chain, Flat, Japanned:
Inch..... 6 8 10
Per doz.....$1.00 1.40 1.65
Cast Iron Flat Shutter, Jap'd., Brass Knobs:
Inch..... 6 8 10
Per doz.....$0.75 .95 1.25
Wrt Barrel Japd.....80@80&10%
Wrt " Bronzed....50@50&10%
Wrt. Spring...70&10@70&10&10%
Wrt. Shutter.....50&5@50&10&5%
Wrt. Square Neck.....75@75&10%
Wrt Square.66⅔&10@66⅔&10&10%
Ives' Patent Door.....60%

Plow and Stove—
Plow .....65&10&10@70%
Stove .....87½&10@—

Tire—
Norway Iron.....80%
Norway Iron.....80%
American Screw Company:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Bay State, list Dec. 28, '99.....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84...82½%
Eclipse, list Dec. 28, '99.....80%
Mount Carmel Bolt Co.:
Norway Phila., list Oct. 16, '84....80%
Eagle Phila., list Oct. 16, '84...82½%
Mount Carmel, list Dec. 28, '99...80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99.....80%
Norway Phila., list Oct., '84.....80%
Upson Nut Co.:
Tire Bolts.....72½%

Borers, Tap—
Borers Tap, Ring, with Handle:
Inch..... 1¼ 1½ 1¾ 2
Per doz...$4.80 5.60 6.40 8.00
Inch 2¼ 2½
Per doz.....$6.65 11.50
Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.65; No. 3, $2.50 each.....25%

Boxes, Mitre—
C. E. Jennings & Co.....30%
Langdon .....15&10%
Perfection 40%
Seavey 33⅓%
Stanley R. & L. Co.:
Nos. 240 to 460.....30%
Nos. 50 and 60.....35%

Braces—
Common Ball Ameircan..$1.25@1.30
Barber's .....50&10&10@60&10%
Fray's Genuine Spofford's.....60%
Fray's No. 70 to 120, 81 to 123, 207 to 414 .....60%
C. E. Jennings & Co.....50&5%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Pat.....50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co., Peck's Pat.60@60&5%
Stanley R. & L. Co.:
Stanley 35%
Victor 45%

Brackets—
Wrought Steel...80&10@80&10&5%
Griffin's Pressed Steel.....80@80&10%
Griffin's Folding Brackets.....70&10%
Stowell's Cast Shelf.....75%
Stowell's Sink.....50%
Western, W. G. Co., Wire.....60&10%

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co.....75&20%
Western, W. G. Co.....80%
Wire Goods Co.....75@75&10%

Buckets, Galvanized—
Price per dozen.

Quart.....	10	12	14
Water, Regular...	*1.40*	*1.70*	*1.90*
Water, Heavy...	*3.40*	*3.70*	*3.80*
Fire, Rd. Bottom..	*2.30*	*2.55*	*2.95*
Well	*2.55*	*2.87*	*3.15*

Bucks, Saw—
Hoosier.....℔ gro. $36.00

Bull Rings—
See *Rings, Bull*

Butts—
Brass—
Wrought, list, Sept., '06..15@—%
Cast Brass, Tiebout's.....50%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow....40&10@50%
Loose Joint.....70&10@75%
Loose Pin.....70&10@75%
Mayer's Hinges.....70@70&5%
Parliament Butts.....70@70&5%

Wrought Steel—
Table and Back Flaps...75%
Narrow and Broad.....75%
Inside Blind.....75%
Loose Pin.....75%
Loose Pin, Jap'd.....70&10%
Loose Pin, Ball and Steeple Tip 85%
Japanned Ball Tip Butts... 70&10%
Bronzed, Wrt., Nar. and Inside Blind Butts....55&10%

Ex. 10&10@10&10&10&10&5%

Cages, Bird—
Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 800 series.....60&10%

Hendryx Bronze:
700, 800 series....40&10%
Hendryx Enameled....40&10%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong.....per lb.4¢@4½¢
Sharp, 1 prong...per lb., 4½¢@4¾¢
Burke's Blunt....4¢@4¼¢
Burke's Sharp....4½@4¾¢
Gautier, Blunt....4¢@4¼¢
Gautier, Sharp....4½@4¾¢
Perkins', Blunt Toe....$3 lb 3.65¢
Perkins', Sharp Toe....$3 lb 4.15¢

Can Openers—
See *Openers, Can.*

Cans, Milk—

	5	8	10 gal.
Illinois Pattern	$1.35	1.85	2.05 each.
New York Pattern	1.50	2.20	2.45 each.
Baltimore Pattern	1.60	2.20	2.45 each.
Dubuque	1.35	1.60	1.75 each.

Cans, Oil—

Buffalo Family Oil Cans:

3	5	10 gal.
$18.00	60.00	125.60 gro., net.

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M 34@35¢
F. L.....per M 40@42¢
G. E.....per M 48@50¢
Musket.....per M 62@63¢

Primers—

Berdan Primers, $2 per M...20%
B. L. Caps (Sturtevant Shells) $2 per M.....20%
All other primers per M.$1.52@1.60

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal. Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd..$1.90
B. B. Caps, Round Ball....$1.40
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets.15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed.....70@70&10%
Plate.....60&10@60&10&5%
Philadelphia.....75@75&10%
Acme, Ball Bearing.....33⅓%
Boss.....70&10%
Boss Anti-Friction.....70&10%
Gem (Roller Bearing).....80%
Martin's Patent (Phoenix).....45%
Standard Ball Bearing.....45%
Tucker's Patent low list.....30%
Yale (Double Wheel) low list.....50%

Cattle Leaders—
See *Leaders, Cattle.*

Chain, Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	7-16	½	9-16
$8.60	5.80	4.85	4.10	3.95	3.85	3.80
⅝	¾	⅞ to 1	1⅛ to 1¼ inch.			
$3.75	3.60	3.55	3.70			

German Coil.....60&10&10@70%

Halter—

Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 24, '97.....60&10&10%
Covert Mfg. Co.
Halter.....35&5%
Covert's Saddlery Works
Halter.....70%

Cow Ties—
See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard: 100 pr.
6½—6-3, Str'ght, with ring..$24.50
6½—6-2, Str'ght, with ring..$25.50
6½—6-2, Str'ght, with ring..$29.50
6½—10-2, Str'ght, with ring..$34.00
NOTE.—Add 2c per pair for Hooks. Twist Traces 2c per pair higher than Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....60&10%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron.....60&10&5@70%
Brass.....60&10@60&10&10%
Safety Chain.....75@75&10%
Gal. Pump Chain.....lb. 4@4½%
Covert Mfg. Co.:
Breast.....35&5%
Heel.....35&5%
Rein.....35&5%
Stallion.....35&5%
Covert Sad. Works:
Breast.....70%
Hold Back.....70%
Rein.....70%
Oneida Community:
Am. Dog Leads and Kennel Chains.....40@40&5%
Niagara Dog Leads and Kennel Chains.....45@50&5%
Wire Goods Co.:
Dog Chain.....70&10%
Universal Dbl.-Jointed Chain.....50%

Chain and Ribbon, Sash—

Oneida Community:
Copper Chain.....60&5%
Steel Chain.....60%
Pullman:
Bronze Chain.....60%
Steel Chain.....60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft.....$1.25@3.00
Sash Ribbon Attachments, per set.8¢

Chalk—(From Jobbers.)

Carpenters' Blue.....gro. 38@40¢
Carpenters' Red.....gro. 33@35¢
Carpenters' White....gro. 28@30¢
See also Crayons.

Checks, Door—

Bordsley's.....45%
Bolting.....60&10%
Pullman, per gro.....$54.00
Russwin.....40%

Chests, Tool—

American Tool Chest Co.:
Boy's Chests, with Tools.....55%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters', etc., Chests, with Tools.....20%
Machinists' and Pipe Fitters' Chests, Empty.....50%
Tool Cabinets.....50%
C. E. Jennings & Co.'s Machinists' Tool Chests.....33⅓&10%

Chisels—

Socket Framing and Firmer
Standard List.....75@75&10%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Socket Firmer No. 10.....60%
C. E. Jennings & Co. Socket Framing No. 15.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
L. & I. J. White.....30@30&5%
L. & I. J. White, Tanged.....25&5%

Tanged—
Tanged Firmers.....33 1-3@40%
Buck Bros.....30%
Charles Buck.....30%
C. E. Jennings & Co. Nos. 191, 181..25%

Cold— lb.
Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Chisels, ordinary... 9@10¢

Chucks—

Beach Pat., each $8.00.....35&5%
Empire.....25%
Blacksmiths'.....25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Patent Chucks:
Independent Lathe Chucks.....50%
Universal.....50%
Combination.....50%
Drill Chucks, New Model.....30%
Drill Chucks, Standard.....45%
Drill Chuck, Skinner Pat., all sizes.35%
Drill Chucks, Positive Drive.....30%
Planer Chucks.....25%
Face Plate Jaws.....40%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination.....50%
Czar Drill.....35%
Combination Geared Scroll.....40%
Geared Scroll.....40%
Independent.....50%
Independent Steel.....40%
Union Drill.....45%
Universal.....50%
Independent Iron F. Plate Jaws.40%
Independent Steel F. Plate Jaws.40%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill..50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%

Clamps—

Adjustable, Hammers'.....30@20&5%
Cabinet, Sargent's.....50&10%
Carriage Makers', P., S. & W. Co.....40&10&10&50%
Carriage Makers', Sargent's.....60%
Besly, Parallel.....33⅓&10%
Lineman's, Utica Drop Forge & Tool Co.....40%
Saw Clamps, see Vises, Saw Filers'.
Wood Workers, Hammers'.....40&10%

Cleaners, Drain—

Iwan's Champion, Adjustable.....55%
Iwan's Champion, Stationary.....45%

Sidewalk—

Star Socket, All Steel..$3 doz. $4.05 net
Star Shank, All Steel..$3 doz. $3.24 net
W. & C. Shank, All Steel, $3 doz., 7½ in., $3.00; 8 in., $3.25.

Cleavers, Butchers'—

Foster Bros.....30%
New Haven Edge Tool Co.'s.....45%
Fayette R. Plumb.....33⅓@33⅓&10%
L. & I. J. White.....30%

Clippers—

Chicago Flexible Shaft Company:
'98 Chicago Horse.....$8.75 } 15%
1902 Chicago Horse.....10.75 }
20th Century Horse, each, $5.00...20%
Lightning Belt.....$15.00 } 15%
Chicago Belt.....$20.00 }
Stewart's Patent Sheep, $12.75....20%

Clips, Axle—

Regular Styles, list July 1, '05.80%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware list:
Compression, Plain Bibbs, Globe, Kerosene, Racking, &c., Cocks.....75@75&5%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list.....40%

Combs, Curry—

Metal Stamping Co.....40%

Mane and Tail—

Covert's Saddlery Works.....60&10%

Compasses, Dividers, &c.

Ordinary Goods.....75&5@75&10%
Bemis & Call Hdw. & Tool Co.:
Dividers.....65%
Calipers, Double.....65%
Calipers, Inside or Outside.....65%
Calipers, Wing.....60%
Compasses.....50%

Conductor Pipe,—

L. C. L. to Dealers: Galvanized.

Territory.	*Nested.*	*Not nested.*
Eastern	*70&15%*	*70&10%*
Central	*70&7½%*	*70&2½%*
Southern	*70&2½%*	*60&20%*
So. Western	*60&20%*	*60&10%*

Copper. 14&16 oz.
Eastern.....50&10%
Central.....50&7½%
Southern.....50&5%
So. Western.....50&2½%
Terms, 60 days; 2% cash 10 days. Factory shipments generally delivered.
See also Eave Troughs.

Coolers, Water—

Gal. each..	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	$2.70
Gal.	3	4	6	8	
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.50	$3.90
Galvanized, Lined, side handles, Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15
White Enameled					25%
Agate Lined					25%

Coopers' Tools—
See *Tools, Coopers'.*

Coppers' Soldering—

Soldering Coppers, 3 lbs. to pair and heavier, 23@24¢; lighter than 3 lbs. to pair.....25@26¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 24¢; No. 7, 24½¢; No. 6, 25½¢.
Cable Laid Italian..... lb., A, 18¢; B, 16¢
Common India.....lb. 10@10½¢
Cotton Sash Cord, Tw'ted..17@19¢
Patent Russia.....lb...@14¢
Cable Laid Russia....lb...@15¢
India Hemp, Braided..lb...@18¢
India Hemp, Twisted..lb. 12@13¢
Patent India, Twisted..lb. 12@13¢
Anniston Cordage Co.: Braided Cotton.
Old Glory, Nos. 7 to 12....$ lb 29¢
Anniston, Nos. 8 to 12, 23¢; No. 7, 23½¢; No. 6, 24½¢; Anniston Drab, Nos. 7 to 12, $ lb, 26¢; Anniston Mahogany, 27¢.
Pearl Braided, cotton, No. 6, $ lb, 24½¢; No. 7, 23½¢; Nos. 8 to 12, 23¢
Eddystone Braided, Nos. 8, 9 and 10, 25¢; 7, 25½¢; 6, 26½¢.
Harmony Cable Laid Italian, Nos. 7 to 10.....$ lb 23 ¢
Peerless:
Cable Laid Italian.....16 ¢
Cable Laid Russian.....14 ¢
Cable Laid India.....12 ¢
Braided India.....18 ¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per doz.10¢
Samson, Nos. 8 to 12:
Braided, Drab Cotton.....$ lb 40 ¢
Braided, Italian Hamp....$ lb 40 ¢
Braided, Linen.....$ lb 55 ¢
Braided, White Cotton or Spot.....$ lb 35 ¢
Massachusetts, White.....$ lb 30 ¢
Massachusetts, Drab.....$ lb 35 ¢
Phoenix, White, Nos. 8 to 12, 27¢; No. 7, 27½¢; No. 6, 28½¢.
Silver Lake:
A quality, Drab.....40 ¢
A quality, White.....35 ¢
B quality, Drab.....35 ¢
B quality, White.....30 ¢
Italian Hemp.....40 ¢
Linen.....57½ ¢
See also Chain and Ribbon.

Wire, Picture—

List Oct., '00.....85&10&10@85&10&10&5%
Hendryx Standard Wire Picture Cord, 85&10&5%

Cradles—

Grain.....40&12½%

Crayons—

White Round Crayons, gr..6@6½¢
Cases, 100 gro., $5.00 at factory.
D. M. Steward Mfg. Co.:
Jumbo Crayons.....gr. $3.50
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square.....gr. $1.50
Rolling Mill Crayons.....gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots, 20%
Zelnicker's Lumber:
Red, Blue, Green.....$ gro. $6.50
Black.....$ gro. $4.00
See also Chalk.

Crooks, Shepherds'—

Fort Madison, Heavy.....$ doz. $7.00
Fort Madison, Light.....$ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden.....50%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847..$ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....$ doz. $3.00
Wm. Rogers & Son.....$ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....50%
Smith & Hemenway Co.....50%
Woodward.....40%

Meat and Food—

American.....30%

Nos.	1	2	3	4	5
Each	$5	$7	$10	$25	$50 $80

Enterprise.....25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$4.50	$6

Dixon's.....$ doz. 40@50%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Ideal.....40&10@50%
Little Giant.....$ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

N. E. Food Choppers.....25%
New Triumph No. 605, $ doz. $24.00..40@50%
Russwin Food, No. 1, $24.00; No. 2, $27.00.....45&10&10%
Woodruff's.....$ doz. 40@50%

Nos.	100	150
	$15.00	$18.00

Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c.....40%
Kraut Cutters, 24 x 7, 26 x 8, 30 x 9.....55%
Kraut Cutters, 36 x 12, 40 x 12....40%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....$ doz. $3.00
Combined Slaw Cutter and Corn Grater.....$ doz. $4.00
Tucker & Dorsey Mfg. Co.:
Kraut Cutters.....40%
Slaw Cutters, 1 Knife..$ gr. $18@$20
Slaw Cutters, 2 Knife..$ gr. $22@$36

Tobacco—

All Iron, Cheap..doz. $4.25@$4.50
Enterprise.....25@30%
National, $ doz., No. 1, $21; No. 2, $18.....40%
Sargent's, $ doz., No. 2.....60%
Sargent's, Nos. 12 and 21.....60&10%

Washer—

Appleton's, $ doz., $16.00....50&10&10%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger..per doz. $9.00
Iwan's Imp'ved Post Hole Auger.40&5%
Iwan's Vaughan Pattern Post Hole Augers.....$ doz. $6.25
Iwan's Perfection Post Hole Digger.....$ doz. $8.25
Iwan's Split Handle Post Hole Diggers.....$ doz. $7.25
Kohler's Universal.....$ doz. $14.00
Kohler's Little Giant.....$ doz. $12.00
Kohler's Hercules.....$ doz. $10.00
Kohler's Invincible.....$ doz. $9.00
Kohler's Rival.....$ doz. $8.00
Kohler's Pioneer.....$ doz. $7.00
Never-Break Post Hole Diggers, $ doz., $24.00.....60%
Samson, $ doz. $34.00.....25%

Dividers—See *Compasses.*

Doors, Screen—

Phillips', style E, ⅞ in....$ doz. $10.00
Phillips', style 077, ⅞ in....$ doz. $7.50
Phillips', style x-y, ⅞ in....$ doz. $10.50

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, $ doz., $18; No. 2, $15; No. 3, $12; No. 4, $16.

Drawing Knives—
See *Knives, Drawing.*

Dressers, Emery Wheel—

Diamond Emery Wheel Dressers....35%
Diamond Wheel Dresser Cutters....35%

Drills and Drill Stocks—

Common Blacksmiths' Drill, each.....$1.50@$1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....40%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills, Nos. 2 and 3.....16⅔%
Johnson's Drill Points.....16⅔%
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved.....40%
Ratchet, No. 012.....40%
Ratchet, Whitney's, P., S. & W..50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00.....33⅓%

Twist Drills—

Bit Stock.....60&10&10@70%
Taper and Straight Shank..... 60&10@60&10&5%

Drivers, Screw—

Screw D'ver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, $ doz., 2½-in., $6; 4-in., $7.50; 6-in., $9.....50%
Buck Bros.' Screw Driver Bits.....30%
Champion.....50%
Edson.....60%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Gay's Double Action Ratchet.....35%
Goodell's Auto..50&10&10@50&10&10&5%
Hurwood.....40%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40&10%
Millers Falls, Nos. 20 and 21....25&10%
Millers Falls, Nos. 11, 12, 41, 42..15&10%
New England Specialty Co.....50&10%
Sargent & Co.'s:
Nos. 1 and 60.....50&10&10%
Nos. 50, 53 and 55.....60&10%
Nos. 20 and 40.....70&10%
Smith & Hemenway Co.....40&5%
H. D. Smith & Co.'s Perfect H'dle.40%
Stanley R. & L. Co.'s:
No. 64, Varn. Handles.....65%
No. 86.....75%
Victor.....55%
Defiance.....70%
Swan's:
Nos. 7565 to 7568.....50%
No. 7540.....40&10%

Eave Trough, Galvanized—

Territory.	*L. C. L.*
Eastern	*80&5%*
Central	*75&10&10%*
Southern	*75&12½%*
So. Western	*75&5%*

Terms,—2% for cash. Factory shipments generally delivered.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:
Galv. Steel and Galv. C. C. Iron and Steel, Standard Gauge.....60&10%
No. 26.....35%
No. 24.....25%
No. 22.....10%
Copper.....37½%

Elbows, Stove Pipe—

Dover, one piece.....40%
Perfect Elbows (8, 8 & Co.).....40%

Emery, Turkish—

	¼ to ½	5¼ to 220	Flour.
Kegs.....lb.	*5 ¢*	*5½ ¢*	*5½ ¢*
½ Kegs.....lb.	*5½ ¢*	*5¾ ¢*	*5¾ ¢*
¼ Kegs.....lb.	*5½ ¢*	*6 ¢*	*6 ¢*
10-lb. cans, 10 in case....	*6½ ¢*	*7 ¢*	*6 ¢*
10-lb. cans, less than 10.....	*10 ¢*	*10 ¢*	*8 ¢*
Less quantity..	*10 ¢*	*10 ¢*	*8 ¢*

NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extractors, Lemon Juice
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's .....50&10%
Walling's .....40&10%

Cord and Weight—
Ives 40%

Faucets—
Cork Lined.....50@50&10%
Metallic Key, Leather Lined..
60&10@70%
Red Cedar.....40&10@50%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Bosa Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined...50%
John Sommer's Reliable Cork Lined..
50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
McKenna, Brass:
Burglar Proof, N. P.....25%
Improved, ¾ and ⅞ inch.....25%
Self Measuring:
Enterprise, ℔ doz. $36.00.....40&10%
Lane's, ℔ doz. $36.00.....40&10%
National Measuring, ℔ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List revised Nov. 1, 1899.
Best Brands.....70&10@75&5%
Standard Brands.75&10@75&10&10%
Lower Grade....75&10&10@80&10%

Imported—
Stubs' Tapers, Stubs' list, July 2¼, '97.....33 1-3@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103.....$3.75
Special, No. 104.....$3.75
Fusible Links, No. 98.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.25*	*3.75*	*4.25*	*4.75*

P., S. & W. Co.....30&10@40%
Reading Hardware Co.....60%
Sargent's 70%
Stowell's Giant Grindstone Hanger..
℔ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy .....50&10&10%
Stowell's Grindstone Fixtures, Light. 60&10%

Fodder Squeezers—
See *Compressors.*

Forks—
NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Iowa Dig-Ezy Potato.....60&10%
Victor, Hay.....60&15&2½%
Victor, Manure.....66⅔%
Victor, Header.....65%
Champion, Hay.....66⅔%
Champion, Header.....65%
Champion, Manure.....60&15&2½%
Columbia, Hay.....60&20%
Columbia, Manure.....70%
Columbia, Spading.....70&12½%
Hawkeye Wood Barley.....40%
W. & C. Potato Digger.....60&10%
Acme Hay.....60&20%
Acme Manure, 4 tine.....60&10&5%
Dakota Header.....60&20%
Jackson Steel Barley.....60&20%
Kansas Header.....65%
W. & C. Favorite Wood Barley.....40%
Plated.—See Spoons.

Frames— Saw—
White, S'g't Bar, per doz.75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.30*	*$1.60*	*$1.90*	*$2.20*	*$2.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*
Hemp $2.75
Cotton 3.20
Waterproof Sgl. Taped..3.65
Waterproof Dbl. Taped..4.40
Waterproof Tpl. Taped..5.15
10&2½%

Gates, Molasses and Oil—
Stebbins' Pattern.....80&10%

Gauges—
Marking, Mortise, &c..50&10@60%
Chapin-Stephens Co.:
Marking, Mortise, &c.50&10@50&10&10%
Scholl's Patent.....50&10@50&10&10%
Door Hangers.....50@50&10%
Stanley R. & L. Co.'s Butt and Rabbet Gauge.....35%
Marking and Mortise.....60%
Wire, Brown & Sharpe's.....25%
Wire, Morse's.....25%
Wire, P., S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.20
Spike, Metal, No. 1, $4.00; 2, $4.30
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $4.30; 2, $4.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....60@60&10&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush..
25&10@50%
International Glue Co. (Martin's)..40%

Grease, Axle—
Common Grade....gro. $4.50@6.00
Dixon's Everlasting..10-lb pails, ea. 85¢
Dixon's Everlasting, in boxes, ℔ doz.
1 lb, $1.20; 2 lb, $2.00
Helmet Hard Oil.....25%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grindstones—
Bicycle Emery Grinder.....$6.50
Bicycle Grindstones, each.....$2.50@3.00
Pike Mfg. Co.:
Improved Family Grindstones, per inch, ℔ doz.....$2.00
Pike Mower and Tool Grinder, each $6.00
Velox Ball Bearing, Mounted, Angle Iron Frames, each.....$3.00

Halters and Ties—
Cow Ties.....60&10@60&10&5%
Covert Mfg. Co.:
Web .....35&5%
Jute Rope.....50%
Sisal Rope.....30&10%
Cotton Rope.....45%
Hemp Rope.....45%
Covert's Saddlery Works:
Web and Leather Halters.....70%
Jute and Manila Rope Halters....70%
Sisal Rope Halters.....60&20%
Jute, Manila and Cotton Rope Ties 70%
Sisal Rope Ties.....60&10%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters..45@50&5%
Niagara Cow Ties....45&5@50&10&5%
E. T. Rugg & Co.:
Leather Halters.....50%
Web Halters and Webbing.....60%
Jute and Sisal Rope Halters.....60%
Jute and Sisal Horse and Cattle Ties 60%
Cotton Horse Ties.....60%
Livery Ties, Braided.....60%

Hammers—
Handled Hammers—
Heller's Machinists'...40&10@40&10&10%
Heller's Farriers.....40&10@40&10&10%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75.....50%
Peck, Stow & Wilcox, Steel.....50%
Fayette R. Plumb:
Plumb, A. E. Nail.....
33⅓&7½@33⅓&10&7½%
Engineers' and B. S. Hand.....
50&7½&5@50&10&7½&5%
Machinists' Hammers.50&5@50&10&5%
Riveting and Tinners'.....
40&2½@40&10&2½%
Sargent's C. S. New List.....40%

Heavy Hammers and Sledges—
Under 3 lb., per lb..50¢..80&5@—%
3 to 5 lb., per lb., 40¢..80&5@—%
Over 5 lb., per lb., 30¢, 80&10&5@—%
Wilkinson's Smiths'...lb. 9½@10¢

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....45@50%
Fork, Shovel, Spade, &c.:
Long Handles.....45@50%
D Handles.....50@50&5%

Cross-Cut Saw Handles—
Atkins' 40%
Champion .....45@45&10%
Disston's 50%

Mechanics' Tool Handles—
Auger, assorted...gro. $2.50@$3.00
Brad Awl.....gro. $1.65@$1.75
Chisel Handles:
Apple Tanged Firmer, gro. assorted .....$2.40@$2.65
Hickory Tanged Firmer, gro. assorted .....$2.15@$2.40
Apple Socket Firmer, gro. assorted .....$1.75@$1.95
Hickory Socket Firmer, gro. assorted .....$1.45@$1.60
Hickory Socket Framing, gro. assorted .....$1.60@$1.75
File, assorted.....gro. $1.30@$1.40
Hammer, Hatchet, &c. 60&10@60&10&5%
Hand Saw, Varnished, doz. 80&85¢; Not Varnished...65@75¢
Plane Handles:
Jack, doz. 30¢; Jack, Bolted.75¢
Fore, doz. 45¢; Fore, Bolted.90¢
Chapin-Stephens Co.:
Carving Tool.....40@40&10%
Chisel .....65@65&10%
File and Awl.....65@65&10%
Saw and Plane.....40@40&10%
Screw Driver.....40@40&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle..
℔ gro. $0.85@$1.50

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track, and Parlor Door Hangers per double set with track, &c.
Allith Mfg. Co.:
Reliable, No. 1.....per doz. $2.00
Reliable, No. 2.....per doz. $2.00
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00.....70%
Roller Bearing, No. 11, $15.00.70%
Roller Bearing, Ex. Hy., No. 22, $18.00.....70%
Hinged Hangers, $16.00....60&10%
Lane Bros. Co.:
Parlor, Ball Bearing.....$4.00
Parlor, Standard.....$3.15
Parlor, No. 105.....$2.85
Parlor, New Model.....$2.80
Parlor, New Champion.....$2.25
Barn Door, Standard.....60&5%
Hinged.....net $6.40
Covered .....60&2%
Special .....70&5%
Lawrence Bros.:
Advance .....60&10%
Cleveland 75%
Clipper, No. 75.....60%
Crown .....60&10%
Easy Parlor Door, Dbl. Sets, $2.50; Single Sets, $1.25.
Giant .....60&5%
Hummer .....70&5%
New York.....60&10%
Peerless 75%
Sterling .....60&10%
McKinney Mfg. Co.:
No. 1, Special, $15.....60&10%
No. 2, Standard, $18.....60&10%
Hinged Hangers, $16.....50%
Meyers' Stayon Hangers.....60&5%
Richards Mfg. Co.:
Pioneer Wood Track No. 3..$2.00
Ball B'r'g St'l Track No. 10,50&10%
Roller B'r'g St'l Track No. 12.$2.15
Roller B'r'g St'l Track No. 13.$2.30
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8.....$2.25
Auto Adj. Track No. 22..50&10%
Trolley B. D. No. 17.....$1.25
Trolley F. D. No. 120.....$2.10
Trolley F. D. No. 121.....$2.25
Trolley F. D. No. 150.....$2.35
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 44..2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&10%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.00
Trolley B. D. No. 20.....50&10%
Trolley B. D. No. 24.....$1.30
Trolley B. D. No. 27.....$1.40
Trolley B. D. No. 28.....$1.60
Roller Bearings Nos. 39, 41, 43 .....75%
Anti-friction No. 42.....60&20%
Hinged Tandem No. 48....60&5%
Folding Door B. B. Swivel No. 135 .....40%
Safety Door Hanger Co.:
Storm King Safety.....60%
U. S. Standard Hinge.....60%
Stowell Mfg. & Foundry Co.:
Acme Parlor Ball Bearing....40%
Ajax Hinge Door.....60%
Apex Parlor Door.....50&10&5%
Atlas 60%
Baggage Car Door.....50%
Climax Anti-Friction.....50&10%
Elevator 40%
Express 50%
Freight Car Door.....60%
Interstate .....60&10%
Lundy Parlor Door.....50&10%
Magic 60%
Matchless .....60&10%
Nansen .....70&5%
Parlor Door.....50&10%
Railroad .....50&10%
Rex Hinge Door.....60%
Street Car Door.....50%
Steel, Nos. 300, 404, 500....50&10%
Underwriters' Fire Door.....40%
Wild West Warehouse Door..50%
Zenith for Wood Track....50&10%
A. L. Sweet Iron Works:
Check Back.....70%
Climax Anti-Friction.....50&10%
Eagle 70%
Hylo Hinge.....60%
New Perfection.....60%
Pilot 60%
Pilot Hinge.....60%
Rider Wooster.....65%
Western Pattern.....70%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing.50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing..℔ doz. $5.00
C. J. Roller Bearing.....60&10%
Cycle Ball Bearing.....50%
Dwarf Ball Bearing.....40%
Ives, Wood Track.....60&10%
L. T. Roller Bearing...60&10&5%
New Era Roller Bearing..50&10%
O. K. Roller Bearing..60&10&5%
Prindle, Wood Track.....60%
Richards' Wood Track.....60%
Richards' Steel Track.....50&10%
Spencer Roller Bearing....60&10%
Tandem, Nos. 1 and 2.....60%
Underwriters' Roller Bearing..40%
Velvet 50%
Wilcox Auditorium Ball B'r'g.30%
Wilcox Barn Trolley No. 123..40%
Wilcox Elv. Door, Nos. 112 and 122½.....50%
Wilcox Elv. Door, No. 132....40%
Wilcox Fire Trolley, Roller Bearing.....30%
Wilcox Le Roy Noiseless Ball Bearing 40%
Wilcox New Century..50&10&10%
Wilcox O. K. Steel Track....50%
Wilcox O. K. Trolley.....50%
Wilcox Trolley Ball Bearing..40%
Wilcox Wideman Narrow Gauge Ball Bearing.....40%
For Track, see Rail.

Extra 5@10% often given.

Hangers— Garment—
Pullman Trouser, ℔ gro., 1 pair Flat Aluminoy, $9.00; 1 pair Round Nickeled, $9.00; 4 pair Round Nickeled.. $27.00
Victor Folding.....℔ gro. $9.00
Western, W. G. Co.....70&10%

Gate—
Myers' Patent Gate Hangers, ℔ doz. net $4.50

Joist and Timber—
Lane Bros. Co.....30%

Hasps—
Griffin's Security Hasp.....50%
McKinney's Perfect Hasp, ℔ doz..50%

Hatchets—
Regular list, first quality....50%
Second quality $1.00 per doz. less than first quality.

Heaters, Carriage—
Clark, No. 5 $1.75; No. 5B, $2.00; No. 3, $2.25; No. 3D, $2.75; No. 7D, $3.00; No. 3E, $3.25; No. 1, $3.50.....15%
Clark Coal, ℔ doz. $0.75.....10%

Hinges—
Blind and Shutter Hinges—
Surface Gravity Locking Blind: (Victor; National; 1868 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)

No.	*1*	*3*	*5*
Doz. pair	*$0.75*	*1.35*	*2.70*

Mortise Shutter: (L. & P., O. S., Dixie, &c.)

No.	*1*	*1½*	*2*	*2½*
Doz. pair	*$0.70*	*.65*	*.60*	*.55*

Mortise Reversible Shutter (Buffalo, &c.):

No.	*1*	*1½*	*2*
Doz. pair	*$0.70*	*.65*	*.60*

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70@75%
Parker Wire Goods Co.:
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Sargent's, Nos. 1, 3, 11 and 13..75&10%
Stanley's Steel Gravity Blind Hinges, ℔ doz. sets, without screws, $0.90; with screws, $1.20.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&10&5%
Acme, Lull & Porter.....75&10%
Queen City Reversible.....75&10%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
1868, Old Pat'n, Nos. 1, 3 & 5.....75&10&5%
Tip Pat'n, Nos. 1, 3 & 5..75&10&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....75&10&5%
Shepard's Double Locking, Nos. 20 & 25.....70%
Champion Gravity Locking, No. 75.75%
Steamboat Gravity Locking, No. 10.75%
Pioneer, Nos. 060, 45 & 5½.....75%
Empire, Nos. 101 & 103.....70%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L'f'chs.	*$2.00*	*2.70*	*5.00*
Hinges only	*1.40*	*2.05*	*3.80*
Latches only	*.70*	*.70*	*.35*

New England:
With Latch.....doz. ...@$2.00
Without Latch...doz. ...@$1.60
Reversible Self-Closing:
With Latch.....doz. ...@$1.75
Without Latch...doz. ...@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz. $1.15
Wrightsville Hardware Co.:
Shepard's or Clark's, doz. sets.

Nos.	1	2	3
Hinges with Latches.	$2.00	2.70	5.00
Hinges only	1.40	2.05	3.80
Latches only	.70	.70	1.35

Pivot Hinges—
Bommer Bros. Pivot.....40%
Lawson Mfg. Co. Matchless.....45%

Spring Hinges—
Holdback, Cast Iron...$6.50@$7.00
Non-Holdback, Cast Iron$6.25@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....45%
Bardsley's Patent Checking..15%
Bommer Bros.:
Bommer Ball Bearing Floor Hinges 40%
Bommer Spring Hinges.....40%
No. 990 Wrot. Steel Hold Back, ℔ gr. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor Hinge 50%
Garden City Engine House....25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, No. 14.....℔ gr. $9.00
Columbia, No. 15.....℔ gr. $25.00
Columbia, Adjustable, No. 7, ℔ gr. $12.00
Gem, new list.....30%
Clover Leaf.....℔ gr. $12.00
Oxford, new list.....30%
Lawson Mfg. Co. Matchless....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....℔ gr. $9.00
Ball Bearing Floor Hinge....50%
Ohio Detachable Screen Door Hinge .....℔ gr. $12.00
The Stover Mfg. Co.:
Ideal, No. 16, Detachable, ℔ gr. $12.50
Ideal, No. 4.....℔ gr. $9.00
New Idea No. 1.....℔ gr. $9.00
New Idea, Double Acting....45%
New Idea Floor.....45%
Van Wagoner:
Ball Bearing.....25%
No. 777 Sh't Steel Holdb't, ℔ gro. pr.$9

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—

Strap and T Hinges, &c., list December 20, 1904:

Light Strap Hinges...70%
H'vy Strap H'g's...75&5%
Light T Hinges.....65%
Heavy T Hinges.....60%
Extra H'y T H'g's.70&10%
Hinge Hasps.....50%
Cor. Heavy Strap...75&5%
Cor. Ex. Heavy T.70&10%

Extra 10@10&5%

Screw Hook and Strap. { *6 to 12 in..lb.3¼¢* ; *13 to 20 in..lb.3½¢* ; *22 to 36 in..lb.3¼¢*

Screw Hook and Eye:
¾ to 1 inch.....lb.6½¢
⅝-inch.....lb.7½¢
½-inch.....lb.8½¢

Hitchers, Stall—

Covert Mfg. Co., Stall Hitchers....35%

Hods— Coal—

	Per doz.			
Inch	*15*	*16*	*17*	*18*
Galv. Open	*$2.50*	*2.75*	*3.00*	*3.25*
Jap. Open	*$1.90*	*2.10*	*2.25*	*2.55*
Galv. Funnel	*$3.00*	*3.30*	*3.60*	*3.90*
Jap. Funnel	*$2.45*	*2.65*	*2.85*	*3.30*

Masons' Etc.—

Avery-Caldwell Mfg. Co.:
Steel Brick.....each $1.00
Steel Mortar.....each $1.25
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $0.95
Steel Mortar, No. 158.....each $1.25

Hoes— Eye—

Scovil and Oval Pattern.....
60&10@60&10&10%
Grub, list Feb. 23, 1899.....
70&10@75&10%
D. & H. Scovil.....33⅓%

Handled—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.

Cronk's Weeding No. 1, $2.00; No. 2, $2.25
Ft. Madison Cotton Hoe....70&10&10%
Ft. Madison Crescent Cultivator Hoe, ℔ doz.....70&10%
Ft. Madison Mattock Hoes:
Regular Weight.....℔ doz. 66⅔%
Junior Size.....℔ doz. $4.00
Ft. Madison Sprouting Hoe..℔ doz. 50%
Ft. Madison Dixie Tobacco Hoe.....
75&10&7½%
Kretsinger's Cut Easy.....70&10%
Warren Hoe.....45&10%
W. & C. Ivanhoe.....75&2%
B. B. 6 in., Cultivator Hoe.....$3.15
B. B., 6¼ in.....$3.35
Acme Wedding.....℔ doz., net, $4.35
W. & C. L'tning Shuffle Hoe.℔doz.$4.85

Hoisting Apparatus—

See *Machines, Hoisting.*

Holders— Bit—

Angular, ℔ doz. $24.00.....45&10%

Door—

Bardsley's.....45%
Empire.....50%
Pullman.....50%

File and Tool—

Nicholson File Holders and File Handles.....33⅓&10%

Fruit Jar—

Triumph Fruit Jar Holder, ℔ gross, $10.80; ℔ doz.....$1.25

Hones—Razor—

Pike Mfg. Co., Belgian, German and Swaty.....50%

Hooks—Cast Iron—

Bird Cage, Reading.....40%
Bird Cage, Sargent's List.....60&10%
Ceiling, Sargent's List, Nos. 29, 32, 33, 129, 132, 133 and 135.....50&10&10%
Clothes Line, Reading List.....40%
Clothes Line, Sargent's List.50&10&10%
Coat and Hat, Sargent's List...50&10%
Clothes Line, Stowell's.....70%
Coat and Hat, Reading.....45&20%
Coat and Hat, Stowell's.....70%
Coat and Hat, Wrightsville.....65%
Harness, Reading List.....40%
Harness, Stowell's.....60%
School House, Stowell's.....70%

Wire—

Belt.....80&10@..%
Wire C. & H. Hooks:.....
75&10@75&10&10%
Columbian Hdw Co., Gem.....70&10%
Parker Wire Goods Co., King...70&10%
Van Wagoner, Coat and Hat.....70%
Western W. G. Co. Molding.....75%
Wire Goods Co.:
Acme.....60&10%
Chief.....70%
Crown.....75%
Czar.....65%
V Brace.....75%
Czar Harness.....50&10%

Wrought Iron—

Box, 6 in., per doz., $1.00; 8 in., $1.25; 10 in., $2.50.
Cotton.....doz. $1.05@$1.25
Wrought Staples, Hooks, &c.—
See Wrought Goods.

Miscellaneous—

Hooks, Bench, see Stops, Bench.
Bush, Light, doz. $4.75; Medium, $5.35; Heavy, $6.25
Grass, best, all sizes, per doz.$1.60
Grass, common grades, all sizes, per doz.....$1.30
Whiffletree.....lb. 5¾@6¢
Hooks and Eyes:
Brass.....60&5@60&10&5%
Malleable Iron.....70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks.....35%
Covert Saddlery Works' Self Locking Gate and Door Hook.....60%
Ft. Madison Cut-Easy Corn Hooks, ℔ doz. $3.25 net
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—

See *Nails, Horse.*

Horseshoes—

See *Shoes, Horses.*

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 5 @ 6 ¢
3-ply Standard.....ft. 8 @ 9 ¢
4-ply Standard.....ft. 10 @11 ¢
3-ply extra.....ft. 11 @13 ¢
4-ply extra.....ft. 14 @16 ¢
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 8 @ 9 ¢
Fair Quality.....ft. 10 @11 ¢

Irons— Sad—

From 4 to 10.....lb. 3 @3½¢
B. B. Sad Irons.....lb. 3¼@3½¢
Chinese Laundry....lb. 4¾@5 ¢
Chinese Sad.....lb. 4 @4¼¢
Mrs. Potts', cents per set:

Nos.	*50*	*55*	*60*	*65*
Jap'd Tops	*68*	*65*	*78*	*75*
Tin'd Tops	*71*	*68*	*81*	*78*

New England Pressing..lb. 3¾@4¢

Pinking—

Pinking Irons.....doz. 60¢

Irons, Soldering

See *Coppers.*

Jacks, Wagon—

Covert Mfg. Co.:
Auto Screw.....30&2%
Steel.....45%
Covert's Saddlery Works:
Daisy.....60&10%
Victor.....60%
Lockport.....50%
Lane's Steel.....30&10&2%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s.....25%

Kettles—

Brass, Spun, Plain.....20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—

Butcher, Kitchen, &c.—

Foster Bros.' Butcher, &c.....50%
Wilkinson Shear & Cutlery Co.....50%

Corn—

Withington Acme, ℔ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—

Standard List.....75@75&10%
C. E. Jennings & Co., Nos. 45, 46..60%
Jennings & Griffin, Nos. 41, 42.....60%
Ohio Tool Co.'s.....70%
Swan's.....75%
Watrous.....16⅔%
L. & I. J. White.....20&5@25%

Hay and Straw—

Serrated Edge, per doz..$5.75@6.00
Iwan's Sickle Edge.....℔ doz. $9.50
Iwan's Serrated.....℔ doz. $10.00

Mincing—

Buffalo.....℔ gro. $13.00

Miscellaneous—

Farriers'.....doz. $3.00@3.25
Wostenholm's.....℔ doz. $3.00@3.25

Knobs—

Base, 2½-inch, Birch, or Maple, Rubber Tip.....gro. $1.25@$1.50
Carriage, Jap., all sizes.....
gro. 40@45¢
Door, Mineral.....doz. 65@70¢
Door, Por. Jap'd.....doz. 70@75¢
Door, Por. Nickel..doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c.15%
Picture, Sargent's.....60&10&10%

Lacing, Leather

See *Belting, Leather—*

Ladders, Store, &c.—

Lane's Store.....25%
Myers' Noiseless Store Ladders....50%
Richards Mfg. Co.:
Improved Noiseless, No. 112.....50%
Climax Shelf, No. 113.....50%
Trolley, No. 109.....50%

Ladles, Melting—

L. & G. Mfg. Co. (low list).....25%
P. S. & W.....50%
Reading.....60%
Sargent's.....50&10%

Lanterns—Tubular—

Regular Tubular, No. 0.....
doz. $4.25@4.50
Lift Tubular, No. 0.....
doz. $4.75@5.00
Hinge Tubular, No. 0.....
doz. $4.75@5.00
Other Styles.....40@40&5%

Bull's Eye Police—

No. 1, 2¾-inch.....$2.75@3.00
No. 2, 3-inch.....$3.00@3.25

Lasts and Stands, Shoe—

Stowell's Atlas, Malleable Iron.....50%
Stowell's Badger, Cast Iron.....50%

Latches— Thumb—

Roggin's Latches, with screw..
doz. 35@40¢

Door—

Cronk & Carrier Mfg. Co., No. 101.
℔ doz. $2.00
Cronk & Carrier Mfg. Co., Latch, Hasp and Staples.....50%
Richards' Bull Dog, Heavy, No. 125.....50&5%
Richards' Trump, No. 127.....$1.50

Leaders, Cattle—

Small.....doz. 50¢; large, 60¢
Covert Mfg. Co., Cotton and Hemp.45%

Lifters, Transom—

R. & E.....33⅓%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.25*	*2.00*	*1.75*
75 feet	*$1.75*	*1.55*	*1.10*

Samson Cordage Works:
Solid Braided Chalk, Nos. 9 to 3..40%
Silver Lake Braided Chalk, No. 9, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50.....℔ gr. 20%
Masons' Lines, Shade Cord, &c.:
White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50.....20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50.....20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25.....20%
Anniston Waterproof Clothes, 50 ft., ℔ gro., $24.00; Gilt Edge, $22.00; Air Line, $22.00; Acme, $17.00; Alabama, $15.00; Empire, $14.00; Advance, $13.50; Oriole, $20.00; Albemarle, $13.50; Eclipse, $12.50; Chicago, $11.00; Standard, $10.00; Columbia, $8.50; Allston, $12.50; Calhoun, $11.00.

Locks— Cabinet—

Cabinet Locks...33⅓@33⅓&7½%

Door Locks, Latches, &c.—

NOTE.—Net Prices are very often made on these goods.

Reading Hardware Co.....40%
R. & E. Mfg. Co.....40%
Sargent & Co.....40&10%
Stowell's Steel Door Latches.....50%

Elevator—

Stowell's.....80%

Padlocks—

Wrought Iron....75&10&5@80&5%
Net prices are general.
R. & E. Mfg. Co. Wrought Steel and Brass.....75&10%

Sash, &c.—

Ives' Patent:
Bronze and Brass.....62½%
Crescent.....50&10%
Iron.....62½%
Window Ventilating.....60%
Robison Patent Ventilating Sash Lock.....40%
Wrought Bronze and Brass.....55%
Wrought Steel.....55%
Pullman Patent Ventilating Lock..25%
Reading.....40%

Machines—Boring—

Com. Upr't, without Augers.$2.00
Com. Ang'l'r, without Augers.$2.25
Swan's Improved.....40&10%

Angular.

Jennings', Nos. 1 and 4.....35&5%
Millers' Falls.....5.75
Snell's, Rice's Pat. 2.50 2.75

Corking—

Reisinger Invincible Hand Power....
℔ doz. $48.00

Fence—

Williams' Fence Machines....each, $5.50

Hoisting—

Moore's Anti-Friction Differential Pulley Block.....30%
Moore's Hand Hoist, with Lock Brake.....20%

Ice Cutting—

Chandler's.....12½%

Washing—

Boss Washing Machine Co.:	Per doz.
Boss No. 1	$57.00
Boss Rotary	$54.00
Champion Rotary Banner No. 1	$54.00
Standard Champion No. 1	$48.00
Standard Perfection	$36.00
Cinti Square Western	$30.00
Uneeda American, Round	$30.00

Mallets—

Hickory.....45&5@50%
Lignumvitæ.....45&5@50%
Tinners' Hickory and Applewood.....doz. 45&5@50%

Mangers, Stable—

Swett Iron Works.....50%

Mashers, Vegetable—

Western, W. G. Co., Potato....60&10%

Mats, Door—

Elastic Steel (W. G. Co.), new list..
50&10%

Mattocks—

See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—

Enterprise Mfg. Co.....25@30%
National list Jan. 1, 1902.....30%
Parker's Columbia & Victoria.50&10@60%
Parker's Box and Side.....50&10@60%
Swift, Lane Bros. Co.....30%

Mowers, Lawn—

NOTE.—Net prices are generally quoted

Cheapest	*all sizes,*	*$1.85@2.00*		
Cheap	*all sizes,*	*$2.00@2.50*		
Better Grade	*all sizes,*	*$2.50@4.50*		
	12	*14*	*16*	*18-in.*
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental.....60&5%
Great American.....70%
Great American Ball B'r'g, new list.70%
Quaker City.....70%
Pennsylvania.....60&5%
Pennsylvania, Jr., Ball Bearing....60%
Pennsylvania Golf.....50%
Pennsylvania Horse.....33⅓&5%
Pennsylvania Pony.....40&5%
Granite State:
Style A, Low Wheel....70&10&10&5%
Style B, Low Wheel.....70&10&5%
Style C, High Wheel.....70&10%
Style D, High Wheel.....70%
Philadelphia:
Styles M., S., C., K., T.....70&5%
Style A, all Steel.....60&5%
Style E, High Wheel.....70&10&5%
Drexel and Gold Coin, special list.50%

Nails—

Wire Nails and Brads, Papered, List July 20, 1899..85&10&10@90%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers' &c. See *Tacks.*

Horse—

	Nos.	*6*	*7*	*8*	*9*	*10*	
Anchor		23	21	20	19	18	...40&5%
Champlain		28	26	25	24	23	...50%
Coleman		15	12	12	11	11	...net
New Haven		25	21	20	19	18	...40&5%
Putnam		23	21	20	19	18	...33⅓%
New Putnam		19	18	17	16	16	..10&10%
Western							℔ lb 8½¢

Jobbers' Special Brands.....
per lb. 8½@10¢

Picture—

	1½	*2*	*2½*	*3*	*3½ in.*
Brass H'd.	*.45*	*.55*	*.60*	*.70*	*.. gro*
Por. Head	*1.10*	*1.10*	*1.10*		*.. gro*

Nippers—

See *Pliers and Nippers.*

Nuts—

Cold Punched: *Off list.*
Mfrs. or U. S. Standard.
Square, Blank or Tapped..$5.00
Hexagon, Blank or Tapped.$5.45
Square, Blank, C. T.....$5.30
Hexagon, Blank, C. T.....$6.05
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square, Blank.....$5.30
Hexagon, Blank.....$5.20
Square, Tapped.....$5.20
Hexagon, Tapped.....$5.70

Oakum—

Best.....lb. 6¼@6½¢
U. S. Navy.....lb. 5¾@6¢
Navy.....lb. 4½@5¢
Plumbers' Spun Oakum..2½@3¢
In carload lots ½¢ lb. off, f.o.b. New York.

Oil Tanks—See *Tanks, Oil.*

Oilers—

Brass and Copper.....50&10%
Tin or Steel.....65&10@70%
Zinc.....65&10@70%
Chase or Paragon:
Brass and Copper.....50&10%
Tin or Steel.....65&10%
Zinc.....65&10%
Malleable, Hammers' Imp'ed, Nos. 11, 12 and 13.....20%
Malleable, Hammers' Old Pattern, Nos. 1, 2 and 3.....50%
American Tube & Stamping Co.:
Spring Bottom Cans.....70@70&10%
Railroad Oilers, &c.....60@60&10%

Openers—Can—

Per doz.
Sprague, Iron Handle....30@35¢
Sprague, Wood Handle...35@40¢
Sardine Scissors.....$1.75@$3.00
National.....50&10%
Stowell's Sprague.....℔ doz. 35@45¢
Vim Tin Shear and Can Opener, ℔ doz., 75c.; per gro., $7.50

Egg—

Nickel Plate.....℔ doz., $2.00
Silver Plate.....℔ doz., $4.00

Packing—

Asbestos Packing, Wick and Rope.....lb. 14@16¢

Rubber—

(Fair quality goods.)

Sheet, C. I.....8@10¢
Sheet, C. O. S.....9@13¢
Sheet, C. B. S.....10@14¢
Sheet, Pure Gum.....50@65¢
Sheet, Red.....40@50¢
Jenkins' '96, ℔ lb 80¢.....25@25&5%

Miscellaneous—

American Packing...lb. 7@10 ¢
Cotton Packing.....lb. 16@25 ¢
Italian Packing.....lb. 9@12½¢
Jute.....lb. ¼@ 1½¢
Russia Packing.....lb. 8@11 ¢

Pails, Creamery—

S. S. & Co., with gauges—No. 1, $6.25; No. 2, $6.50 ℔ doz.

Pails, Water, Well, &c.—

See *Buckets.*

Pans— Dripping—

Standard List.60&10@60&10&12½%

Fry—

Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz	*$0.75*	*0.80*	*0.90*	*1.10*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz	*$1.95*	*2.25*	*2.80*	*3.15*

Roasting and Baking—

Regal, S., S. & Co., ℔ doz., Nos. 5, $4.50; 10, $5.25; 20, $5.75; 30, $6.25.
Savory, ℔ doz., net, Nos. 200, $9.00; 400, $15.00.
Simplex, ℔ gro.:

No.	40	50	60	140	150	160
	$30.00	35.00	42.00	34.00	39.00	46.00

Paper—Building Paper

Asbestos:	*lb.*	
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft.	*6¢*	*Per roll*
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lbs., per 100 sq. ft.	*8¢*	*Per roll*
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in.	*10¢*	*Per roll*

Rosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll 35@40¢
Medium weight, 30 lbs. to roll, 40@45¢
Heavy weight, 40 lbs. to roll.. 58@60¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb. ton.....$15.00@50.00
Red Rope Roofing, 250 sq. ft. per roll.....$1.75

Tarred Paper—

1 ply (roll 300 sq. ft.), ton.... $32.50@35.50
2 ply, roll 108 sq. ft.....55@60¢
3 ply, roll 108 sq. ft.....75@85¢

Slater's Felt (roll 500 sq. ft.) .75¢
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.) $2.75

Sand and Emery—

Flint Paper and Cloth .60@60&10%
Garnet Paper and Cloth 25%
Emery Paper and Cl'h .50&10@60%

Parers— Apple—

Advance	℔ doz.	$4.00
Baldwin	℔ doz.	$4.00
Bonanza Improved	each	$6.50
Daisy	℔ doz.	$4.00
Dandy	each	$7.50
Eureka Improved	each	$20.00
Family Bay State	℔ doz.	$15.00
Improved Bay State	℔ doz.	$36.00
Little Star	℔ doz.	$5.00
New Lightning	℔ doz.	$7.00
Reading 72	℔ doz.	$3.25
Reading 75	℔ doz.	$6.25
Rocking Table	℔ doz.	$6.20
Turn Table '98	℔ doz.	$6.00
White Mountain	℔ doz.	$5.00

Potato—

Saratoga	℔ doz.	$7.00
White Mountain	℔ doz.	$6.00

Picks and Mattocks—

List Feb. 23, 1899 ..... 75%
Cronk's Handled Garden Mattock ℔ doz., $6.40 ..... 33⅓%

Pinking Irons—

See *Irons, Pinking.*

Pins, Escutcheon—

Brass ..... 60@60&10%
Iron, list Nov. 11, '85 ..60@60&10%

Pipe, Cast Iron Soil—

Carload lots.
Standard, 2-6 in. 60%
Extra Heavy, 2-6 in. 70%
Fittings 75%

Pipe, Merchant—

Consumers, Carloads.

	Steel.		*Iron.*	
	Blk.	*Galv.*	*Blk.*	*Galv.*
⅛ & ¼ in..	*71%*	*55%*	*68½%*	*52½%*
⅜ & ½ in..	*75%*	*63%*	*72½%*	*60½%*
¾ to 6 in..	*79%*	*69%*	*77%*	*67%*
7 to 12 in..	*74%*	*59%*	*72%*	*56½%*

Pipe, Vitrified Sewer—

Carload lots.
Standard Pipe and Fittings, 2 to 24 in.:
New England 68%
New York and New Jersey. 71%
Maryland, Delaware, E. Pa. 75%
West. Pa. and West Va.... 77%
Virginia 76%
Ohio, Michigan and Ky.... 77%
Indiana 77%
NOTE.—Carload lots are generally delivered.

Pipe, Stove—

Edwards' Nested Stove Pipe:	C. L.	L. C. L.
5 in., per 100 joints	$7.00	$8.00
6 in., per 100 joints	7.50	8.50
7 in., per 100 joints	8.50	9.50

Planes and Plane Irons—

Wood Planes—

Bench, first qual. ..... 40&10%
Bench, Second qual. ..... 50&10%
Molding ..... 33⅓&10%
Bailey's (Stanley R. & L. Co.) 40%
Chapin-Stephens Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Toy and German ..... 40@40&10%
Chaplin's 60%
Ohio Tool Co.:
Bench, First Quality ..... 40@40&10%
Bench, Second Quality ..... 50@50&10%
Molding ..... 33⅓@33⅓&10%
Adjustable Wood Bottom 60%
Union 60%

Iron Planes—

Bailey's (Stanley R. & L. Co.) 40%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) 35%
Ohio Tool Co.'s Iron Planes 60%
Sargent's ..... 60&10%
Union 60%

Plane Irons—

Wood Bench Plane Irons ..... 25&10@30%
Buck Bros. 30%
Chapin-Stephens Co. ..... 30@30&10%
Ohio Tool Co. 30%
Stanley R. & L. Co. 35%
Union 50%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand—

Kohler's Eclipse ..... ℔ doz. $8.50

Plates—

Felloe ..... lb. 3¾@4¼¢
Self-Sealing Pie Plates (S., S. & Co.) ℔ doz. $2.00 ..... 50%

Pliers and Nippers—

Button Pliers .... 75&10@75, 10, 5%
Gas Burner, per doz., 5 in., $1.25 @ $1.30; 6 in., $1.45 @ $1.50.

Gas Pipe..	*7*	*8*	*10*	*12-in.*
	$2.00	*$2.25*	*$3.00*	*$3.75*

Acme Nippers ..... 50&5%
Cronk & Carrier Mfg. Co.:
American Button ..... 75&10%
Cronk's 60%
Stub's Pattern 50%
Combination and others 33⅓%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&10@40&10&10%
The Nettleton Mfg. Co. Reversible Cutting Nippers 50%
P., S. & W. Tinners' Cutting Nippers 40%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—

Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10&10%
Chapin's Imp. Brass Cor. 40@40&10&10%
Pocket Levels ..... 30@30&10&10%
Disston's Plumbs and Levels 70%
Disston's Pocket Levels 10%
C. E. Jennings & Co.'s Iron 33⅓%
C. E. Jennings & Co.'s Iron, Adjustable ..... 40&7½%
Stanley R. & L. Co. 45%
Stanley's Duplex 35%
Woods' Extension 33⅓%

Poachers, Egg—

Buffalo Steam Egg Poachers, ℔ doz., No. 1, $6.00; No. 2, $9.00; No. 3, $9.00; No. 4, $12.00 ..... 50%

Points, Glaziers'—

Bulk and 1-lb. papers, lb. 8½@9 ¢
½-lb. papers ..... lb. 9 @9½¢
¼-lb. papers ..... lb. 9¾@10¼¢

Pokes, Animal—

Ft. Madison Hawkeye ..... ℔ doz. $3.25
Ft. Madison Western ..... ℔ doz. $4.00

Police Goods—

Manufacturers' Lists... 25@25&5%
Tower's 25%

Polish—Metal, Etc—

Glasbrite, No. 2, 5 lb can (powder), each, $1.25; ℔ doz., $12.00; No. 2, 10 lb can (cake), each, $2.50; ℔ doz., $24.00.
Prestoline Liquid, No. 1 (⅛ pt.), ℔ doz., $3.00; No. 2 (1 qu.), $9.72 ..... 40%
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ℔ doz. 50¢; ℔ gro. $4.50; ½ lb boxes, ℔ doz. $1.25; 1 lb boxes, ℔ doz. $2.25.
U. S. Liquid, 8 oz. cans, ℔ doz., $1.25; ℔ gro., $12.00.
Barkeepers' Friend Metal Polish, ℔ doz., $1.75; ℔ gro., $18.00.
Wynn's White Silk, ½ pt. cans, ℔ doz. $2.00

Stove—

Black Eagle Benzine Paste, 5 lb cans, ℔ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ℔ doz. 75¢
Black Jack Paste, ¾ lb cans, ℔ gr. $9.00
Black Kid Paste, 5 lb can ..... each, $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon's, ℔ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ℔ lb 8¢
Fireside ..... ℔ gr. $2.50
Gem, ℔ gr. $4.50 ..... 10%
Japanese ..... ℔ gr. $3.50
Jet Black ..... ℔ gr. $3.50
Peerless Iron Enamel, 10 oz. cans.. ℔ doz. $1.50
Wynn's:
Black Silk, 5 lb pail ..... each 70¢
Black Silk, ½ lb box ..... ℔ doz. $1.00
Black Silk, 5 oz. box ..... ℔ doz. $0.75
Black Silk, ½ pt. liq ..... ℔ doz. $1.00

Poppers, Corn—

1 qt., Square ..... gro. $9.00
1 qt., Round ..... gro. $10.00
1½ qt., Square ..... gro. $11.00
2 qt., Square ..... gro. $13.00

Post Hole and Tree Augers and Diggers—

See also *Diggers, Post Hole, &c.*

Posts, Steel—

Steel Fence Posts, each, 5 ft., 42¢; 6 ft., 46¢; 6½ ft., 48¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—

See *Parers, Potato.*

Pots, Glue—

Enameled 40%
Tinned 35%

Powder—

In Canisters:
Duck, 1 lb ..... each 45¢
Fine Sporting, 1 lb.... each 75¢
Rifle, ½-lb. ..... each 15¢
Rifle, 1-lb. ..... each 25¢
In Kegs:
12½-lb. kegs $3.50
25-lb. kegs $4.50
King's Semi-Smokeless:
Keg (25 lb bulk) $6.50
Half Keg (12½ lb bulk) $3.50
Quarter Keg (6¼ lb bulk) $1.90
Case 24 (1 lb cans bulk) $8.50
Half case (1 lb cans bulk) $4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Robin Hood Sm'less Shot Gun.. 50&20%

Presses—

Fruit and Jelly—

Enterprise Mfg. Co. ..... 20@25%

Seal Presses—

Morrill's No. 1, ℔ doz., $20.00 ..... 50%

Pruning Hooks and Shears

See *Shears.*

Pullers, Cork—

Invincible Cork Puller $21.00

Pullers, Nail—

Cyclops 50%
Miller's Falls, No. 3, ℔ doz., $12.00 ..... 33⅓&10%
Morrill's No. 1, Nail Puller, ℔ doz. $20.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
Pelican, ℔ doz. $9.00 ..... 40&10%
Scranton, Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B, No. 2, case lots ..... ℔ doz. $6.00
Diamond B, No. 3, case lots ..... ℔ doz. $5.50
Giant No. 1, ℔ doz. $18; No. 2, $16.50; No. 3, $15 ..... 33⅓%
Staple Pullers 60%
Parrot Tack and Stub Puller, ℔ doz., 75c.; ℔ gro., $6.00

Pulleys, Single Wheel—

Inch	*1½*	*1¾*	*2*	*3*
Awning or Tackle, doz.	*$0.30*	*.35*	*.60*	*1.05*

Hay Fork, Swivel or Solid Eye. doz., ¼ in., $1.25; 5 in., $1.55

Inch	*2*	*2¼*	*2½*
Hot House, doz.	*$0.65*	*.85*	*1.20*
Inch	*1¾*	*1½*	*1¾*	*2*
Screw, doz.	*$0.16*	*.19*	*.25*	*.30*
Inch	*1¾*	*2*	*2¼*	*2½*
Side, doz.	*$0.25*	*.40*	*.53*	*.60*
Inch	*1½*	*1¾*	*2*	*2½*

Stowell's:
Ceiling or End, Anti-Friction.. 60&10%
Dumb Waiter, Anti-Friction.. 60&10%
Electric Light 60%
Side, Anti-Friction ..... 60&13%

Sash Pulleys—

Common Frame; Square or Round End, per doz, 1¾ and 2 in. ..... 16@19¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in..16@19¢
Acme ..... 1¾ in., 16¢; 2 in., 19¢
Fox-All-Steel, Nos. 3 and 7, 2 in.... ℔ doz. 50%
Grand Rapids All Steel Noiseless.. 50%
Ideal ..... 70&10%
Niagara ..... 1¾ in., 16¢; 2 in., 19¢
No. 26, Troy.. 1¾ in., 14½¢; 2 in., 16½¢
Star ..... 1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks.

Pumps—

Cistern ..... 60@60&10%
Pitcher Spout ..... 80@80&10%
Wood Pumps, Tubing, &c. 45@50%
Barnes Dbl. Acting (low list) 50%
Barnes' Pitcher Spout ..... 75&10&5%
Contractors' Rubber Diaphragm No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ℔ doz. $6.75
Flint & Walling's Fast Mail Hand, (low list) 55%
Flint & Walling's Fast Mail (low list) ..... 55&5%
Flint & Walling's Tight Top Pitcher. 80%
National Specialty Mfg. Co., Measuring, $6.00 ..... 30%
Mechanical Sprayer $6.00
Myers' Pumps (low list) 50%
Myers' Power Pumps 50%
Myers' Spray Pumps ..... 50&10%

Pump Leathers—

Plunger and Lower Valve—Per gro.:

Inch...	*2*	*2¼*	*2½*	*2¾*
	$2.20	*2.50*	*2.75*	*3.00*
Inch...	*3*	*3¼*	*3½*	*3¾*	*4*
	$3.30	*3.60*	*3.85*	*4.10*	*4.40*

Plunger Cup Leathers—Per 100:

Inch...	*2½*	*3*	*3½*	*4*
	$2.75	*3.85*	*5.00*	*6.00*

Punches—

Saddlers' or Drive, good..... doz. 50@75¢
Spring, single tube, good quality ..... $1.75@2.00
Revolving (4 tubes) ..... doz. $3.50@3.75
Bemis & Call Co.'s Cast St'l Drive. 50%
Bemis & Call Co.'s Check 55%
Morrill's Nos. 1AA, 1A, 1B, 1C, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 40%
Niagara Solid Punches ..... 55&10%
Steel Screw, B. & K. Mfg. Co. 50%
Tinners' Hollow, P., S. & W. Co.. 40%
Tinners' Solid, P., S. & W. Co., ℔ doz., $1.44 ..... 60%

Rail—Barn Door, &c.—

Sliding Door, Painted Iron.... 2½@2¾¢
Sliding Door, Wrought Brass, 1¼ in., lb., 36¢ 30%
Allith Mfg. Co.:
No. 1, Reliable Hgr. Track, ℔ ft. 5¼¢
No. 2, Reliable Hgr. Track, ℔ ft. 7¢
Cronk's:
Double Braced Steel Rail..℔ ft. 2¾¢
O. N. T. Rail ..... 2½¢
Griffin's:
xxx, ℔ 100 ft., 1 x 3-16 in., $3.00; 1¼ x 3-16 in., 3.50.
Hinged Hanger, ℔ 100 ft., 1 x 3-16 in., $3.10; 1¼ x 3-16 in., $3.60.
Lane's:
Hinged Track, ℔ 100 ft., 1 in., $3.40; 1¼ in., $4.10.
O. N. T., ℔ 100 ft., 1 in., $2.75; 1¼ in., $3.50; 1½ in., $4.00.
Standard, 1¼ in. ..... ℔ 100 ft. $4.00
Lawrence Bros.:
℔ 100 ft. No. 201, $4.00; No. 202, $4.00
New York, 1 x 3-16 in., ℔ 100 ft. $2.75
McKinney's:
Hinged Hanger Rail, ℔ ft., 11¢ .. 50%
None Better ..... ℔ ft. 3¾¢
Standard ..... ℔ ft. 4¢
Myers' Stayon Track ..... 60&10%
Richards' Mfg. Co.:
Common 1 x 3-8 in., $2.25; 1¼ x 3-16, $2.50; 1¼ x 3-16, $2.75.
Special Hinged Hanger Rail...60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ℔ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢
Safety Door Hanger Co.'s Storm King Safety 60%
Safety Door Hanger Co.'s U. S. Standard 60%
Stowell's:
Cast Rail ..... ℔ ft. 1¾¢
Steel Rail, Plain 25%
Wrought Bracket, 1 3-16 in.... ℔ ft. 3¢
Wrought Bracket, 1½ x 5-16.. ℔ ft. 7¢
Swett's Hylo, ℔ ft. 11¢ 60%
P. L. B. Steel Rail ..... ℔ 100 ft. $3.00
No. 0, 1 x 3-16 ..... ℔ 100 ft. $2.75

Rakes—

NOTE.—Manufacturers are selling from the list of September 1, 1904, but many jobbers are still using list of August 1, 1899, or selling at net prices.
Fort Madison Red Head Lawn.... $2.25
Fort Madison Blue Head Lawn.... $2.70
Jackson Lawn, 29 and 30 teeth, ℔ doz., net $4.25
Cronk's:
New Champion Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00.. 75%
Victor Garden, ℔ doz., 12 teeth, $15.00; 14, $16.50; 16, $18.00 ..... 80%
Queen City Lawn, ℔ doz., 20 teeth, $3.45; 24, $3.60 ..... net.
Anticlog Lawn, ℔ doz. $4.00
Malleable Garden ..... 70&10%
Kohler's:
Lawn Queen, 20-tooth ..... ℔ doz. $3.45
Lawn Queen, 24-tooth ..... ℔ doz. $3.60
Paragon, 20-tooth ..... ℔ doz. $2.75
Paragon, 24-tooth ..... ℔ doz. $3.00
Steel Garden, 14-tooth .... ℔ doz. $2.40
Malleable Garden, 14-tooth, ℔ doz. $1.75@2.00
Weldless Steel Garden ..... 75&5%

Rasps, Horse—

Disston's 75%
Heller Bros.' ..... 70&5@70&10&5%
McCaffrey's American St'd... 60&10&5%
New Nicholson ..... 70&10@75%
See also Files.

Razors—

Boras—I C 60%
Fox Razors, No. 42.. ℔ doz. $20.00 } Dis. 40%
Fox Razors, No. 44.. ℔ doz. $20.00 } Dis. 40%
Fox Razors, No. 82, Platina... ℔ doz. $25.00 } Dis. 40%
Red Devil 50%
Silberstein:
Carbo Magnetic $18.00
Griffon, No. 65 ..... $15.00
Griffon, No. 00 ..... $12.00
All other Razors 40%

Safety Razors—

Silberstein 40%

Reels, Fishing—

Hendryx:
M 6, Q 6, A 6, B 6, M 9¾, M 16, Q 16, A 16, B 16, 4008, Rubber Populo, Nickeled Populo 20%
Aluminum, German Silv., Bronze. 25%
1240 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 20%
2904 P 33⅓%
2904 PN 33⅓%
0924 N 33⅓%
02084 N 33⅓%
002904 PN 33⅓%
802 N 33⅓%
986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—*List July 1, 1903.*

Japanned, Electroplated and Bronzed ..... 70&10%
Bronzed 75%

Revolvers—

Single Action ..... 95¢@$1.00
Double Action, except 44 cal. $1.85
Double Action, 44 caliber.... $2.00
Automatic $3.45
Hammerless $4.00

Riddles, Hardware Grade

16 in. ..... per doz. $2.25@$2.50
17 in. ..... per doz. $2.50@$2.75
18 in. ..... per doz. $2.75@$3.00

Rings and Ringers—

Bull Rings—

	2	*2½*	*3 inch.*
Steel	*$0.70*	*0.75*	*0.80 doz.*
Copper	*$1.00*	*1.15*	*1.40 doz.*

Rea's Improved Self-Piercing, Copper, 2 in., ℔ doz., $1.25; 2½ in., $1.50; 3 in., $1.75.

Hog Rings and Ringers—

Hill's Rings, gro. boxes $4.00@4.50
Hill's Ringers, Gray Iron ..... doz. 50@55¢
Hill's Ringers, Malleable Iron .. doz. 70@75¢
Blair's Rings...per gro. $4.75@5.25
Blair's Ringers. per doz. $0.60@ .65
Brown's Rings..per gro. $5.00@5.50
Brown's Ringers. per doz. $0.60@ .65

Rivets and Burrs—

Copper ..... 50&5@50&10%
Iron or Steel ..... 75@75&5%

Rollers—

Acme, Stowell's Anti-Friction 50%
Barn Door, Sargent's list 60%
Cronk's Stay No. 65, $0.90; No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56 ..... $0.84
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53. 75¢
O. K. Adj. and Reversible No. 58. 50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%
Stowell's Barn Door Stay.. ℔ doz. $1.00
Swett's Anti-Friction 50%
Screw and Spike Stay ..... ℔ doz. 60¢
Hinge Adjustable Stay ..... ℔ doz. 90¢

Rope—

Manila, 7-16 in. diam. and larger: Pure ..... lb., 12½¢
Sisal, 7-16 in. diam. and larger: Pure ..... lb., 10¢
Sisal, 7-16 in. diam. and larger: No. 2 quality ..... lb., 8¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Mixed ..... lb., 8¢
Pure ..... lb. 10¢
Sisal, Tarred, Medium Lath Yarn, Coarse and Untarred: Mixed ..... lb. 8¢
Pure ..... lb. 10¢
Best, ¼-in. and larger. 16½@18¢
Medium, ¼-in. and larger. 15½@16½¢
Common, ¼-in. and larger.. 10¢
In coils, ½¢ advance.
Jute Rope:
Thread No. 1, ¼-in. & up. lb. 6½¢
Thread No. 2, ¼-in. & up, lb. 5½¢
Old Colony' Manila Transmission Rope ..... ℔ lb 17½¢

Wire Rope—

Galvanized ..... 37½&2½%
Plain ..... 45&2½%

Ropes, Hammocks—
Covert Mfg. Co.:
Jute 50%
Sisal ..... 30&10%
Covert Saddlery Works ..... 60&5%

Rulers, Desk—
Stimpson & Son:
Boxwood and Maple ..... 30&10%

Rules—
Boxwood ..... *60&10&10%*
Ivory ..... *35&10@35&10&5%*
Chapin-Stephens Co.:
Boxwood ..... 60@60&10%
Flexifold ..... 27½&10&10&2½%
Ivory ..... 35@35&10&10%
Miscellaneous ..... 50@50&10&10%
Combination ..... 55@55&10%
Stationers' ..... 10@10&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber 60%
Stanley R. & L. Co.:
Boxwood 62½%
Ivory 45%
Miscellaneous 60%
Zig Zag 40%
Zig Zag, Pin Joint 42½%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*

Sash Locks—
See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 50%
Band ..... 50&10@60
Cross Cuts ..... 35&5%
Mulay, Mill and Drag 50%
One-Man Saw 40%
Wood Saws 40%
Hand, Compass, &c 40%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 14 in. wide 60%
Band, ⅛ to 1¾ 60%
Crosscuts 50%
Narrow Crosscuts 55%
Mulay, Mill and Drag 50%
Framed Woodsaws 35%
Woodsaw Blades 35%
Woodsaw Rods 25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c 25%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 25%
Butcher Saws 30%
Compass and Key Hole Saws ..... 35&5%
Framed Wood Saws 30%
Hand Saws ..... 20&2½%
Wood Saw Blades 35%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 50%
Crescent Ground Cross Cut Saws 35%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 50%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 40%
Compass, Key Hole, &c ..... 25@25&7½%
Wood Saws ..... 35@35&7½%
Springfield Mach. Screw Co.:
Diamond Kitchen Saws ..... 40&10@50%
Butcher Saws Blades ..... 35@40%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saws—
Atkins' Hack Saw Blades A A A 25%
Disston's:
Concave Blades 25%
Keystone 40%
Hack Saw Frames 30%
Fitchburg File Works, The Best 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete ..... 40&7½%
Goodell's Hack Saw Blades 40%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Springfield Mach. Screw Co.:
Diamond Hack Saw Blades 35%
Diamond Hack Saw Frames 50%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 10%
Victor Hack Saw Blades 25%
Victor Hack Saw Frames 40%

Scroll—
Barnes' No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Lester, complete, $10.00 ..... 15&10%
Rogers, complete, $4.00 ..... 15&10%

Scalers, Fish
Covert's Saddlery Works ..... 60&10%

Scales—
Family, Turnbull's ..... *50@50&10%*
Counter:
Hatch, Platform, ½ oz. to ¼ lbs. ..... *doz. $5.50*
Two Platforms, ½ oz. to 8 lbs. ..... *doz. $16.00*
Union Platform, Plain ..... *$1.70@1.90*
Union Platform, Stpd. ..... *$1.85@2.15*
Chatillon's:
Eureka 25%
Favorite 40%
Crocers' Trip Scales 50%
Chicago Scale Co.:
The "Little Detective" ..... 25 lbs 50%
Union or Family No. 2 ..... 60%
Portable Platform (reduced list) 50%
Wagon or Stock (reduced list) ..... 25@35%
"The Standard" Portables 50%
"The Standard" R. R. and Wagon 50%

Scrapers—
Box, 1 Handle ..... *doz. $2.00@2.25*
Box, 2 Handle ..... *doz. $2.60@2.85*
Ship ... Light, $2.00; Heavy, $4.50
Adjustable Box Scraper (S. R. & L. Co.), $6.00 ..... 45%
Chapin-Stephens Co., Box, 30@30&10&10%

Screens, Window and Frames—
Air Line Pattern Screens ..... 60&10%
Flyer Pattern Screens ..... 60&10@60&10&5%
Maine Screen Frames ..... 40&10&5%
Perfection Screens ..... 60&10@60&10&5%
Phillips' Screen Frames ..... 60&5@60&10%
See also *Doors.*

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1⅛, $3.00@3.25; 1¼, $3.50@3.75
Bench, W'd, Beech, doz. 30@30&5%
Hand, Wood ..... *30@30&5%*
R. Bliss Mfg. Co., Hand ..... 30@30&10%
Chapin-Stephens Co., Hand ..... 30@30&10%
Ohio Tool Co., Bench and Hand 30%

Coach, Lag and Hand Rail—
Lag, Cone Point, list Oct. 1, '99 ..... *75&15%*
Coach, Gimlet Point, list Oct. 1, '99 ..... *75&10%*
Hand Rail, list Jan. 1, '81 ..... *70&10@75%*

Jack Screws—
Standard List ..... *80@80&5%*
Millers Falls ..... 50&10&10%
Millers Falls, Roller ..... 50&10%
P., S. & W 50%
Sargent ..... 70&10%
Swett Iron Works ..... 75&10@80&5%

Machine—
List Jan. 1, '98:
Flat or Round Head, Iron ..... *50@50&10%*
Flat or Round Head, Brass ..... *50@50&10%*

Set and Cap—
Set (Iron) *80%*
Set (Steel), net advance over Iron *25%*
Sq. Hd. Cap *75%*
Hex. Hd. Cap *75%*
Rd. Hd. Cap ..... *60&10%*
Fillister Hd. Cap ..... *60&10&10%*

Wood—
List July 23, 1903.
Flat Head, Iron ..... *87½&10@..%*
Round Head, Iron ..... *85 &10@..%*
Flat Head, Brass ..... *85 &10@..%*
Round Head, Brass ..... *80 &10@..%*
Flat Head, Bronze ..... *77½&10@..%*
Round Head, Bronze ..... *75 &10@..%*
Drive Screws ..... *87½&10%*

Scroll Saws—
See *Saws, Scroll.*

Scythes—
Per doz.
Grass, No. 1, Plain Finish *$6.25*
Clipper, Bronzed Webb *$6.50*
No. 3 Clipper, Pol'd Webb *$6.75*
No. 6 Clipper & Solid Steel *$7.00*
Bush, Weed & Bramble, No. 2 ..... *$6.50*
Grain, No. 1 ..... *$8.25*
Bronzed Webb, No. 1 ..... *$8.50*
Nos. 3 & 4 Clipper, Grain *$8.75*
Solid Steel No. 6 ..... *$9.25*

Seeders, Raisin—
Enterprise ..... 25@30%

Sets—Awl and Tool—
Aiken's Sets, Awl and Tools:
No. 20, ℔ doz., $10.00 ..... 60&10%
Fray's Adj. Tool Handles, Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7 ..... 50%
C. E. Jennings & Co.'s Model Tool Holders 30%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 ..... 15&10%

Garden Tool Sets—
Ft. Madison Three Plows, Hoe, Rake and Shovel ..... ℔ doz sets $9.00

Sets, Nail—
Octagon ..... *gro. $3.50@3.75*
Buck Bros. 27½%
Cannon's Diamond Point, ℔ gro. $12 ..... 40%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt. ..... ℔ gro. $7.20
Snell's Knurled, Cup Pt. ..... ℔ gro. $7.20
Springfield Mach. Screw Co.:
Diamond Knurled Cup Pt. ℔ gro. $7.50

Rivet—
Regular list ..... *75@75&10%*

Saw—
Aiken's:
Genuine ..... 50&10%
Imitation ..... 50&10%
Atkin's:
Criterion 40%
Adjustable 40%
Bemis & Call Co.'s:
Cross Cut 30%
Plate 30%
Disston's Star and Monarch 25%
Morrill's No. 1, $15.00 ..... 50%
Nos. 3 and 4, Cross Cut, $20.00 ..... 50%
No. 5, Mill, $30.00 ..... 50%
Nos. 10, 11, 95, $15.60 ..... 50%
No. 1 Old Style, $10.00 ..... 50%
Special, $16.25 ..... 50%
Giant Royal Cross Cut ..... ℔ doz. $8.00
Royal, Hand ..... ℔ doz. $4.50
Taintor Positive ..... ℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s 60%

Sharpeners, Knife—
Chicago Wheel & Mfg. Co. 70%
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50
} 40%

Skate—
Smith & Hemenway Co. 20%

Shaves, Spoke—
Iron ..... *doz. $1.10@1.25*
Wood ..... *doz. $1.75@2.25*
Bailey's (Stanley R. & L. Co.) 45%
Razor Edge (Stanley R. & L. Co.) 35%
Chapin-Stephens Co. ..... 30@30&10&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%
Wood's F1 and F2 ..... 50%

Shears—
Cast Iron..	*7*	*8*	*9 in.*
Best	*$16.00*	*18.00*	*20.00 gro.*
Good	*$13.00*	*15.00*	*17.00 gro.*
Cheap	*$5.00*	*6.00*	*7.00 gro.*

Straight Trimmers, &c.:
Best quality Jap ..... *70@70&10%*
Best quality, Nickel ..... *60@60&10%*
Fair quality, Jap ..... *80@80&5%*
Fair quality, Nickel ..... *75@75&10%*
Tailors' Shears ..... *40@40&10%*
Acme Cast Shears ..... 40@40&5%
Heinisch's Tailor's Shears 10%
Wilkinson's Sheep, 1900 list ..... 50&10%

Tinners' Snips—
Steel Blades ..... *20&5@20&10%*
Steel Laid Blades ..... *40&10@50%*
Forged Handles, Steel Blades, Berlin ..... 50@50&5%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s, 6½ to 10 in. 50%
Niagara Snips 40%
P., S. & W. Forged Handles 20%

Pruning Shears—
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz. $18.00 ..... 25%
Disston's Pruning Hook, ℔ doz. $12.00 ..... 25%
John T. Henry Mfg. Co.:
Pruning Shears, all grades ..... 50&10%
P., S. & W. Co. 33⅓%
Wilkinson's Hedge, 1900 list ..... 50&10%
Wilkinson's Lawn and Border 50%

Sheaves—Sliding Door—
Stowell's Anti-Friction 50%
Patent Roller, Hatfield's, Sargent's list ..... 70&10%
Reading 40%
R. & E. list 33⅓%
Wrightsville Hatfield Pattern 80%

Sliding Shutter—
Reading list 40%
R. & E. list 33⅓%
Sargent's list ..... 10&10%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, Club, Rival, 10 and 12 gauge ..... 65&10%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic, 10, 12, 16 and 20 gauge ..... 25&10%
Blue Rival, New Climax, Challenge, Monarch, Defiance, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge ..... 20&5%
Climax, Union, League, New Rival, 10 and 12 gauge ..... 25&5%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ..... 20&5%
Expert, Metal Lined and Pigeon, 10, 12, 16 and 20 gauge ..... 33⅓&5%
Robin Hood, Low Brass ..... 20&10%
Robin Hood, High Brass ..... 30&10%

Shells, Loaded—
Loaded with Black Powder *40%*
Loaded with Smokeless Powder, medium grade ..... *40&5%*
Loaded with Smokeless Powder, high grade ..... *40&10&10%*
Robin Hood Smokeless Powder:
Robin Hood, Low Brass 50%
Comets, High Brass ..... 50&10&5%

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... *per keg $4.00*
Steel ..... *per keg $3.75*
Burden's, all sizes ..... ℔ keg $3.90

Shot—
Drop, up to B, 25-lb. bag *$1.70*
Drop, B and larger ..... *per 25-lb. bag, $1.95*
Buck, 25-lb. bag *$1.95*
Chilled, 25-lb. bag *$1.95*

Shovels and Spades—
Association List, Nov. 15, 1902 ..... *40%*

Snow Shovels—
Long Handle ..... *$2.75@$3.00*
Wood and Mail, D. Handle ..... *$3.25@$3.50*

Sieves and Sifters—
Hunter's Imitation ..... *gro. $9.50@10.00*
Hunter's Genuine ..... *per gro. $12.00@12.50*
Buffalo Metallic Blued, S. S. Co., ℔ gr.:
14&16 — $13.20
16&18 — $13.50
18&20 — $14.40
Shaker (Barler's Pat.) Flour Sifters, ℔ doz. $2.00 ..... 20%

Sieves, Seamless Metallic
—*Per dozen.*—

Mesh	*14*	*16*	*18*	*20*
Iron Wire	*$1.05*	*1.05*	*1.10*	*1.20*
Tinned Wire	*$1.15*	*1.15*	*1.20*	*1.30*

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... *doz. $0.90@0.95*
Mesh 20, Nested ..... *doz. $1.00@1.05*
Mesh 24, Nested ..... *doz. $1.30@1.40*

Sinks, Cast Iron—
Standard list ..... *60@60&10%*
Barnes' low list ..... 60&5%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron ..... *80@80&10%*
Steel ..... *40@40&10%*

Slates, School—
Factory Shipments.
"D" Slates ..... *50@50&10%*
Eureka, Unexcelled Noiseless ..... *60&5 tens*
Victor A, Noiseless ..... *60&5 tens 45%*

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German ..... *40@40&10%*
Covert Mfg. Co.:
Derby ..... 30&2%
High Grade 35%
Jockey 35%
Trojan 30%
Yankee ..... 30&2%
Yankee Roller ..... 30&2%
Covert's Saddlery Works:
Crown 60%
German 60%
Model 60%
Triumph 60%
Oneida Community:
Harness Snaps, 1 inch ..... 60&5%
Swivel Snaps 60%
Swivels 50%
Sargent's Patent Guarded ..... 66⅔&10%

Snaths—
Scythe *50%*

Snips, Tinners—See *Shears.*

Spoons and Forks—Silver Plated—
Good Quality ..... *50&10@60&5%*
Cheap ..... *60@60&10%*
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous—
German Silver ..... *60@60&5%*
Cattaraugus Cutlery Co.:
Seneca Silver 50%

Tinned Iron—
Teas ..... *per gro. 45@50¢*
Tables ..... *per gro. $0.50@$1.00*

Springs—Door—
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman (Coil) 25%
Reliance (Coil) ..... 40&10%
Star (Coil) 30%
Torrey's Rod, 39 in. ..... ℔ doz. $1.10
Victor (Coil) ..... 50&10&10%

Carriage, Wagon, &c.—
1¼ in. and Wider:	*Per lb*
Black	*4@4¼¢*
Half Bright	*4@4¼¢*
Bright	*4½@4¾¢*

Painted Seat Springs:
1½ x 2 x 26 ..... *per pr. 42¢*
1½ x 3 x 28 ..... *per pr. 70¢*

Sprinklers, Lawn—
Enterprise ..... 25@30%
Philadelphia No. 1, ℔ doz. $12; No. 2, $15; No. 3, $24 ..... 30%
Pfeuger & Henger Mfg. Co.:
Cactus 70%
Japanese 75%
Nationals 65%

Squares—
Nickel plated } *List Jan. 5, 1900.*
Steel and Iron } *75&5@75&10%*
Rosewood Hdl. Try Square and T-Bevels ..... *60&10&10@70%*
Iron Hdl. Try Squares and T-Bevels ..... *40&10@40&10&10%*
Disston's Try Sq. and T-Bevels 70%
Winterbottom's Try and Miter, No. 1, 40%; No. 2 ..... 50%

Squeezers, Lemon
Wood, Common, gro., No. 0, $5.25@$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined:
Cheap ..... *doz. $1.00*
Good Grade ..... *doz. $1.25*
Tinned Iron ..... *doz. $0.75@1.25*
Iron, Porcelain Lined ..... *doz. $1.75*

Staples—
Barbed Blind ..... *lb. 6@6½¢*
Electricians', Association list ..... *80&10&10&10%*
Fence Staples, Plain, $2.25; Galvanized *$2.55*
Poultry Netting Staples ..... *per lb. 3¼@3½¢*
Grand Crossing Tack Co.'s list ..... 80&10%

Steels, Butchers'—
Dick's 30%
Foster Bros. 30%
C. & A. Hoffmann's 40%

Steelyards ..... 30@30&10%

Stocks and Dies—
Blacksmiths' ..... *50@50&10%*
Curtis Rev'bie Ratchet Die Stock 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plates 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones—Oil, &c.
Chicago Wheel & Mfg. Co., 1904 list:
Gem Corundum Oil, Double Grit 60%
Gem Corundum Axe, Single or Double Grit 60%
Gem Corundum Slips 60%
Gem Corundum Razor Hones 50%
Pike Mfg. Co., 1904 list: ℔ lb.
Arkansas St. No. 1, 3 to 5½ in. $2.80
Arkansas St. No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 68¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 30¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 80¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 60¢
} 33⅓%

India Oil Stones (entire list)....33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit.....33⅓%
Quickcut Emery and Corundum Axe Stone, Double Grit.....33⅓%
Quickcut Emery Rubbing Bricks.33⅓%
Hindostan No. 1, R'g'lar.₰ lb 8¢
Hindostan No. 1, Small..₰ lb 10¢
Axe Stones (all kinds).....
Turkey Oil Stones, Extra, 5 to 8 in.....₰ lb 80¢
Queer Creek Stones, 4 to 8 in.20¢
Queer Creek Slips.....40¢
Sand Stone.....8¢
} 33⅓%

Scythe Stones—

Chicago Wheel & Mfg. Co.:
Gem Corundum, 10 in., $8.00 ₰ gro., 12 in., $10.80.
Norton Emery Scythe Stones:
Less than gross lots.....₰ gro. $9.00
One gross or more.....₰ gro. $7.20
Lots of 10 gross or more..₰ gro. $6.00
Pike Mfg. Co., 1901 list:
Black Diamond S. S..₰ gro. $12.00
Lamoille S. S.....₰ gro. $11.00
White Mountain S. S.₰ gro. $9.00
Green Mountain S. S..₰ gro. $6.00
Extra Indian Pond S.S.₰ gro. $7.50
No. 1 Indian Pond S.S.₰ gro. $7.00
No. 2 Indian Pond S.S.₰ gro. $4.50
Leader Red End S. S.₰ gro. $4.50
Quick Cut Emery....₰ gro. $10.00
Pure Corundum,.....₰ gro. $18.00
Crescent.....$7.00
Emery Scythe Rifles, 2 Coat, $8
Emery Scythe Rifles, 3 Coat, $10
Emery Scythe Rifles, 4 Coat, $12
Balance of 1904 list 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers.....₰ gro. $9.00

Stops— Bench—

Millers Falls.....15&10%
Morrill's, ₰ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Door—

Chapin-Stephens Co.....60@60&10%

Plane—

Chapin-Stephens Co.....20%

Straps— Box—

Cary's Universal, case lots.....25&20%

Hame—

Covert's Saddlery Works.....60&10%

Stretchers, Carpet—

Cast Iron, Steel Points, doz. 60@60&10%
Socket .....doz. $1.80
Excelsior Stretcher and Tack Hammer Combined, ₰ doz. $6.00.....20%

Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Co., list Jan. 1, 1902 .....30&5%

Sweepers, Carpet—

National Sweeper Co.: ₰ doz.
Louis XV, Roller Bearing, Gold Plated $120.00
Hepplewhite, Roller Bearing, Silver Plated.....$72.00
Sheraton, Roller Bearing, N'kel.$60.00
Ye Mission, Roller Bearing, Oxidized Coppered.....$36.00
Transparent, Roller Bearing, Plate Glass top, Nickeled.....$36.00
National Queen, Roller Bearing, Fancy Veneers.....$27.00
Loyal, Roller Bearing, Veneers, Nickeled $25.00
Triple Medal, Roller Bearing, Nickeled $24.00
Marion, Roller Bearing, N'kel.$24.00
Marion Queen, Roller Bearing, Nickeled $24.00
Monarch, Roller Bearing, N'kel.$22.00
Monarch, Roller Bearing, Jap..$20.00
Perpetual, Regular B'r'gs, N'kel.$20.00
Perpetual, Regular B'r'gs, Jap..$18.00
Monarch Extra (17 in, case), Roller Bearing, Nickeled.....$36.00
Monarch Extra (17 in, case), Roller Bearing, Japanned.....$33.00
Auditorium (26 in, case), Roller Bearing, Nickeled.....$54.00
Mammoth (30 in, case), Roller Bearing, Nickeled.....$60.00

NOTE.—Rebates: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $3 per dozen on ten-dozen lots; $2.50 per dozen on twenty-five-dozen lots.

Streator Metal Stamping Co.:
Model E, Sanitaire.....₰ doz $25.00
Model A, Sterling.....₰ doz. $25.00
Model B, Sterling, Nickeled..... ₰ doz. $23.00
Model B, Sterling, Japanned..... ₰ doz. $21.00
Model C, Sterling.....₰ doz. $21.50
Model D, Sterling.....₰ doz. $19.50

Tacks, Finishing Nails, &c.

New List, May 1, 1905.
American Carpet Tacks..90&37½%
American Cut Tacks....90&37½%
Swedes Cut Tacks.....90&37½%
Swedes Upholsterers' Tacks.... 90&50%
Gimp Tacks.....90&50%
Lace Tacks.....90&50%
Trimmers' Tacks.....90&37½%
Looking Glass Tacks.....65%
Bill Posters' and Railroad Tacks, 90&50%
Hungarian Nails.....85%
Finishing Nails.....70%
Trunk and Clout Nails....80&5%

NOTE.—The above prices are for Standard Weights. An extra 5% is given on Medium Weights, and an extra 10&5% is given on light weights.

Miscellaneous—

Double Pointed Tacks..... 90&6 or 7 tens
Steel Wire Brads, R. & E. Mfg. Co.'s list .....50&10@60%
See also Nails, Wire.

Tanks, Oil— Each.

Emerald, S., S. & Co.....30-gal. $3.40
Emerald, S., S. & Co.....60-gal. $4.25
Queen City, S., S. & Co....30-gal. $3.65
Queen City, S., S. & Co....60-gal. $4.50

Tapes, Measuring—

American Asses' Skin ..50@—%
Patent Leather.....25@30&5%
Steel .....33 1-3&5%
Chesterman's .....25@25&5%
Eddy Asses' Skin.....40&10@50%
Eddy Patent Leather.....25@30&5%
Eddy Steel.....40@40&10%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list..... 35@35&5%
Pocket .....35@35&5%
Lufkin's:
Asses' Skin.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather....25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ⅝-inch and larger... per 100 lbs. $2.75@$3.00

Thermometers—

Tin Case.....80&10@80&10&5%

Ties, Bale—Steel Wire—

Single Loop.....80&2½%
Monitor, Cross Head, &c....70%

Brick Ties—

Niagara Brick Ties.....25&10%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—

Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White.....20@20&5%

Hay—

Myers' Hay Tools.....50%
Stowell's Hay Carriers.....50%
Stowell's Hay Forks.....50%
Stowell's Fork Pulleys.....50%

Miniature—

Smith & Hemenway Co.'s.....25%

Saw—

Atkins' Cross Cut Saw Tools.....40%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%

Ship—

L. & I. J. White.....25%

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz. $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz. $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....75@75&5%
Newhouse .....40@45&5%
Hawley & Norton.....65%
Victor .....70&10%
Oneida Community Jump.....50%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes 8½@9¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, each $1.21; ₰ doz. $13.25
No. 3, Rat, ₰ dos. $6.50; case of 50 $5.75 doz.
No. 3½, Rat, ₰ doz. $5.25; case of 72 ₰ gro. $4.70 doz.
No. 4, Mouse, ₰ doz. $3.85; case of 150 $3.00 doz.
No. 5, Mouse, ₰ doz. $3.00; case of 150 $2.25 doz.

Trimmers, Spoke—

Wood's E 1.....50%

Trowels—

Disston Brick and Pointing.....30%
Disston Plastering.....25%
Disston " Standard Brand " and Garden Trowels.....35%
Kohler's Steel Garden Trowels, 5 in. ₰ gro. $4.80
Kohler's Steel Garden Trowels, 6 in. ₰ gro. $6.00
Never-Break Steel Garden Trowels.. ₰ gro. $6.00
Rose Brick and Plastering.....25&5%
Woodrough & McParlin, Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern.....50&10%
Western Pattern.....60&10%
Handy Trucks.....₰ doz. $16.00
Grocery .....₰ doz. $15.00
Daisy Stove Trucks, Improved Pattern .....₰ doz. $18.50
McKinney Trucks.....each $10.00
Model Stove Trucks.....₰ doz. $18.50

Tubs, Wash— *No. 1 2 3*

Galvanized, per doz..$4.25 4.75 5.25
Galvanized Wash Tubs (S., S. & Co.):
No. 1 2 3 10 20 30
Per doz., net.$5.70 6.30 7.20 6.60 7.20 8.10

Twine, Miscellaneous—

Flax Twine: BC. B.
No. 9, ¼ and ½-lb. Balls..22@24¢
No. 12, ¼ and ½-lb. Balls..18@20¢
No. 18, ¼ and ½-lb. Balls..16@18¢
No. 24, ¼ and ½-lb. Balls..16@18¢
No. 36, ¼ and ½-lb. Balls..15@17¢
Chalk Line, Cotton ½-lb. Balls .....25@30¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....10@18¢
Cotton Wrapping, 5 Balls to lb., acording to quality...11½@20¢
American 2-Ply Hemp, ¼ and ½-lb. Balls.....13@14¢
American 3-Ply Hemp, 1-lb. Balls .....13@14¢
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).....8½¢
India 3-Ply Hemp, 1-lb. Balls..8½¢
India 3-Ply Hemp, 1½-lb. Balls. 7@8¢
2, 3, 4 and 5-Ply Jute, ½-lb. Balls .....9@10¢
Mason Line, Linen, ½-lb. Bls..46¢
No. 264 Mattress, ¼ and ½-lb. Balls .....37¢
Wool, 3 to 6 ply....B 6¢; A 6½¢

Vises—

Solid Box.....60%

Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40%
Standard 40%
Amateur 25%
Columbian Hdw. Co.....40%
Emmert Universal:
Pattern Makers' No. 1, $15.00; No. 2, $12.50.
Machinist and Tool Makers' No. 4A, $12.50; No. 5A, $7.00; No. 6A, $10.00; No. 10A, $22.50.
Presto Quick Acting.....25@25&5%
Tiger Machinists'.....40%
Fisher & Norris Double Screw..15&10%
Hollands':
Machinists' .....40@40&5%
Keystone .....65&5@70%
Lewis Tool Co.:
Adjustable Jaw.....30%
Monarch 50%
Solid Jaw.....50%
Merrill's 20%
Millers Falls.....60&10%
Massey Vise Co.:
Clincher 40%
Perfect 20%
Lightning Grip.....20%
Parker's:
Victor .....20@25%
Regulars .....20@25%
Vulcan's .....40@45%
Combination Pipe.....55@60%
Prentiss .....20@25%
Sargent's 40%
Snediker's X. L.....33⅓%
Stephens' 33⅓%
Williamson Mfg Co, Double Swivel.. 40&5%

Saw Filers—

Disston's D 3 Clamp and Guide, ₰ doz. $30.....25%
Perfection Saw Clamps, ₰ dos....$4.50
Reading 60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....45&50%

Wood Workers—

Massey Vise Co.:
Lightning Grip.....15%
Perfect 15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Bignall & Keeler Combination Pipe Vise .....60&10%
Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe.....40%
Parker's Combination Pipe:
87 Series.....60%
187 Series.....60&5%
No. 870.....40%
Williamson Mfg. Co. Double Swivel Combination Pipe.....40&5%

Wads—*Price per M.*

B. E., 11 up.....60¢
B. E., 9 and 10.....70¢
B. E., 8.....80¢
B. E., 7.....80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger..$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25
Dis. 15%

Ware, Hollow—

Cast Iron, Hollow—

Stove Hollow Ware:
Enameled 55%
Ground 60%
Plain or Unground.....65%
Country Hollow Ware, per 100 lbs. $2.75
White Enameled Ware:
Maslin Kettles.....70%
Covered Wares
Tinned and Turned.....40%
Enameled 50%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware.....60%
Iron Clad Ware.....70&10%
Lava, Enameled.....40&10%
Never Break Enameled.....50%

Tea Kettles—

Galvanized Tea Kettles:
Inch..... 6 7 8 9
Each .....45¢ 50¢ 55¢ 65¢

Steel Hollow Ware—

Avery Spiders and Griddles..65@65&5%
Avery Kettles.....60%
Porcelained .....50&—50&10%
Never Break Spiders and Griddles.. 65&5%
Never Break Kettles.....60%
Solid Steel Spiders and Griddles.65&5%
Solid Steel Kettles.....60%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

Solid Zinc: ₰ doz.
Crescent, family size, bent frame.$3.25
Red Star, family size, stationary protector $3.25
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$2.90
Cable Cross, family size, stationary protector.....$3.15
Single Zinc Surface:
Naiad, family size, open back, perforated $2.65
Saginaw Globe, protector, family size, ventilated back.....$2.50
Brass Surface:
Brass King, Single Surface, open back $3.25
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.25
Glass Surface:
Glass King, Single Surface, open back $3.25
Enamel Surface:
Enamel King, Single Surface, ventilated back.....$3.25

Washers—Leather, Axle—

Solid .....60&10@80&10&10%
Patent .....90@90&5%
Coil: ⅞ 1 1⅛ 1¼ Inch. 10¢ 11¢ 12¢ 15¢ per box

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers ...$6.00 5.10 3.80 3.60 3.40

The above prices are based on 5.40¢ off list.

In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Cast Washers—

Over ½ inch, barrel lots..... per lb. 1¾@2¢

Weather Strip—Flexible Felt—

Lined, per 100 ft., $2; $3; $4.....40&10%
Moore's Unlined, per 100 ft., $2; $3; $4 .....50&10%

Wedges—

Oil Finish.....lb. 2.70@2.80¢

Weights—Hitching—

Covert Mfg. Co.....40&2%
Covert's Saddlery Works.....60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District...$27.50@$28.00
Southern Territory.$20.00@$23.00
Western and Central Districts .....$23.00@$25.00

Wheels, Well—

8-in., $1.55; 10-in., $2.00; 12-in., $2.50; 14-in., $4.00.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....80%
10 to 18.....80&2½%
19 to 26.....80&7½%
27 to 36.....80&2½%
Galvanized:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 16.....72½&10&2½%
19 to 26.....75%
27 to 36.....72½%
Coppered:
6 to 9.....75&5%
10 to 14.....75&7½%
15 to 18.....72½&10&2½%
19 to 26.....75&10&5%
27 to 36.....75%
Tinned:
6 to 14.....75&10&2½%
15 to 18.....75&7½%
Annealed, Steel and Tinned, on Spools ..70&10@10@70&10&10&10%
Brass and Copper on Spools... 60&5@60&10&5%
Brass, list Feb. 26, '96..... 20%
Copper, list Feb. 26, '96..... 25%
Cast Steel Wire.....50%
Wire Clothes Line, see Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

List June 24, 1903....90&25@—%

Wire Cloth and Netting—

Galvanized Wire Netting..... 80&5@80&10%
Painted Screen Cloth, 100 ft., $1.10
Standard Galv. Hardware Grade:
Nos. 2, 2½ & 3 Mesh, sq. ft..3 ¢
Nos. 4 and 5 Mesh, sq. ft..3½¢
No. 6 Mesh, sq. ft.....3½¢
No. 8 Mesh, sq. ft.....4 ¢

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ....75&10@75&10&10%
Alligator or Crocodile..70&10@75%
Baxter Pattern S Wrenches... 70&5@70&10%
Drop Forged S.....45@45&5%
Acme .....60&10%
Alligator Pattern.....70%
Bull Dog.....70%
Bemis & Call's:
Adjustable S.....40%
Adjustable S Pipe.....40%
Bemis Pipe.....60%
Briggs Pattern.....40%
Combination Black.....40&5%
Combination Bright.....40%
Merrick Pattern.....50%
Boardman's 40%
Coes' Genuine Knife Hdl..40&10&5&5%
Coes' Genuine Steel Hdl..40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes', Genuine Hammer Handle..... 40&10&5&5%
Coes' " Mechanics' "...40&10&10&5&5%
Donohue's Engineer.....40&10%
Eagle .....50&10%
Elgin Wrenches, ₰ doz.....$6.25
Elgin Retheading Attachment, one die, ₰ doz.....$6.25
Elgin Extra Dies, ₰ doz.....$3.00
Elgin Extra Jaws, ₰ doz.....$1.75
Elgin Monkey Wrench Pipe Jaws, ₰ doz.....$2.10
Gem Pocket.....30%
Hercules 70%
W. & B. Machinist:
Case lots.....50&5%
Less than case lots.....50%
Solid Handles, P., S. & W....50&10@60
Stillson- 65%
Vulcan Chain.....50%

Fruit Jar—

Triumph Fruit Jar Wrench, 5 gross lots, ₰ gross, $7.50; ₰ doz.....$0.80

Wringers—

Tuttle Roller Press Mop Pail Wringer, each, $8.00; ₰ doz.....$48.00

Wrought Goods—

Staples, Hooks, &c., list March 17, '92.....90@90&10%

Yokes, Neck—

Covert Saddlery Works, Trimmed..70%
Covert Saddlery Works, Neck Yoke Centers 70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers' & Freighters' .....list net

Zinc—

Sheet.....per 100 lbs., $7.75@8.00

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:	
1 to 1¾ in. round and square	₩ ℔ 2.15¢
1½ to 4 in. x ⅜ to 1 in.	₩ ℔ 2.25¢
1½ to 4 in. x ¼ to 5-16	₩ ℔ 2.35¢
Rods—⅜ and 11-16 round and square	₩ ℔ 2.35¢
Angles:	Cts ₩ ℔
3 in. x ¼ in. and larger	2.50¢
3 in. x 5-16 in. and ¼ in.	2.60¢
1½ to 2½ in. x ⅛ in.	2.35¢
1½ to 2½ in. x 5-16 in. and thicker	2.30¢
1 to 1¼ in. x 5-16 in.	2.35¢
1 to 1¼ x ⅛ in.	2.40¢
⅞ x ⅛ in.	2.55¢
¾ x ⅛ in.	2.65¢
⅝ x ⅛ in.	3.70¢
¼ x 5-32 in.	4.20¢
Tees:	
1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ in.	2.35¢
3 in. and larger	2.70¢
Beams	2.50¢
Channels, 3 in. and larger	2.50¢
Bands—1½ to 6 x 3-16 to No. 8	2.30¢
"Burden's Best" Iron, base price	3.05¢
Burden's "H. B. & S." Iron, base price	2.85¢
"Ulster"	3.10¢
Norway Bars	3.30¢
Norway Shapes	3.80¢

Merchant Steel from Store—

	per ℔
Bessemer Machinery	2.00¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black.

	One Pass, C.R. Soft Steel.	R. G. Cleaned.
No. 14	₩ ℔ 2.55	2.60¢
Nos. 18 to 21	₩ ℔ 2.75	2.80¢
No. 27	₩ ℔ 2.90	3.10¢
No. 28	₩ ℔ 3.00	3.20¢

Russia, Planished, &c.

Genuine Russia, according to assortment	₩ ℔ 11¾@14¢
Patent Planished	₩ ℔ A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 16	₩ ℔, 2.95¢
Nos. 22 to 24	₩ ℔, 3.55¢
No. 27	₩ ℔, 3.80¢
No. 28	₩ ℔, 4.05¢

No. 20 and lighter 36 inches wide, 25¢ higher.

METALS—

Tin—

Straits Pig ₩ ℔ 35¾@36 ¢

Tin Plates—

American Charcoal Plates (per box.)

A.A.A. Charcoal:	
IC, 14 x 20	$5.80
IX, 14 x 20	7.05
A. Charcoal:	
IC, 14 x 20	$5.05
IX, 14 x 20	6.15

American Coke Plates—Bessemer—

IC, 14 x 20	108 ℔	$4.15
IX, 14 x 20		5.15

American Terne Plates—

IC, 20 x 28	$8.20
IX, 20 x 28	10.30

Copper—

Lake Ingot	₩ ℔ 18¼@18¾¢
Casting	₩ ℔ 18¼@18¾¢
Sheet Copper Hot Rolled, 16 oz.	₩ ℔ 23¢
" " 14 "	" " 24¢

Sheet Copper Cold Rolled, 1¢ ₩ ℔ advance over Hot Rolled.
Sheet Copper Polished 20 in. wide and under, 1¢ advance over Cold Rolled.
Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.
Bottoms, Pits and Flats ₩ ℔ 27¢ basis
Planished Copper, 1¢ ₩ ℔ more than Polished.

Seamless Brass Tubes—

Stubs' W G.	Outside Diameter. ¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1¼	1½
4-11	..	..	..	..	..	..	..	..	..	..	22	22
12	..	..	..	..	..	..	28	28	27	27	22	22
13	..	..	..	..	..	..	29	29	27	27	22	22
14	..	..	..	..	29	29	29	27	27	27	23	23
15	..	..	..	30	29	29	29	27	27	27	23	23
16	..	..	30	30	29	29	29	27	27	27	24	24
17	..	33	30	30	29	29	29	27	27	27	25	25
18	33	35	31	31	30	30	30	28	28	28	26	26
19	63	35	31	31	30	30	30	28	28	28	27	27
20	64	35	31	31	30	30	30	28	28	28	28	28
21	66	51	38	32	32	30	29	29	29	29	29	29
22	71	56	35	35	33	33	31	30	30	30	30	30
23	76	61	37	37	35	35	33	33	33	33	33	33
24	81	66	53	48	46	45	44	43	41	40	40	41
25	86	71	56	51	49	47	46	45	44	44	45	46

Iron Pipe Sizes—Brass

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
30	29	24	23	22	22	22	22	23	23	22	23	24	26	28	29¢ ₩ ℔

Brazed Brass Tubing.

Discount from List June 6, 1898, 25&2%.
Bronze and Copper Tubing advance on Brass List 3¢

Roll and Sheet Brass—

Discount from List June 6, 1898, 17½%.

Spelter—

Western ₩ ℔ 6¼ @ 6¼¢

Zinc.

No. 9, base, casks, ₩ ℔ 8.25¢ | Open ₩ ℔ 8.75¢

Lead.

American Pig ₩ ℔ 6.00@6.10¢
Bar ₩ ℔ 6.60@7.00¢
Old Lead in exchange, 4¢ ₩ ℔

Solder.

½ & ½, guaranteed ₩ ℔ 22 @22½¢
No. 1 ₩ ℔ 20¼@20¾¢
Refined 18½@19

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ ℔ 14¼¢
U. S.	13¼¢
Hungarian and Japanese	12½¢

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:

Small lots	₩ ℔ 37¢
100-℔ lots	₩ ℔ 35¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Copper, Heavy Cut and Crucible	₩ ℔ 16¢
Copper, Heavy and Wire	₩ ℔ $15.75
Copper, Light and Wire	per lb. $14.50
Heavy Brass	₩ ℔ 10.50 ¢
Light Brass	₩ ℔ 8.50 ¢
Lead	₩ ℔ 5.15 ¢
Tea Lead	₩ ℔ 4.75 ¢
Zinc	₩ ℔ 4.75 ¢
No. 1 Pewter	₩ ℔ 21 ¢
No. 2 Pewter	₩ ℔ 6 ¢
Pure Aluminum, Sheet	₩ ℔ 22 ¢
No. 1 Yard Wrought	$18.50@19.50
Wrought Pipe	$14.75@15.25
No. 1 Machinery Cast	$14.00@15.00
Stove Plate	$11.00@12.00

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